DESIGN FOR WELL-BEING

ARCHITECTURE TO REDUCE HEALTH INEQUITY

PAIGE FALK | NORTH DAKOTA STATE UNIVERSITY | THESIS DESIGN

SIGNATURE PAGE

Design for Well-being
Architecture to Reduce Health Inequity

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ABSTRACT

As a society, we are faced with ever-changing healthcare costs and quality of care. Unfortunately, not everyone can access, or afford, the care that they need. Throughout the country, many people are facing illness and injury untreated, due to the cost of healthcare. While the issue has been addressed on a national scale, the problems are not always dealt with on a local scale for the needs of the community. Dealing with the factors of health inequity, such as housing, community, food shortage, education, and environment, will lead us to changing the communities where the problem is located and bring about a society where everyone can achieve health and wellbeing.

Finding a solution to health inequities is a problem that needs to be solved. This thesis will seek to develop the efficiency of healthcare architecture in a way that makes it more affordable to those it who cannot currently access it. This will be done through cost evaluation, efficiency analyses, and green design, with the goal of creating a community center and clinic for neighborhoods on a local scale. If designed correctly, this design may be implemented as a base model for other neighborhoods with health disparities across the country.

NARRATIVE

Context:

Being healthy is not an opportunity that is available to everyone. Many people face shortages of food, lack of healthcare access, or are unable to afford it. Due to the cost of healthcare, many people are facing illness and injury untreated throughout the country. While the quality of care is important and most commonly associated with good health, the role of the community environment where people live also has a major influence.

Health determinants, such as education, community and family support, income, access and quality of care, physical activity, and food availability, are some of the leading causes of health inequities.

Health inequity refers to the determinants of health that are both unjust and avoidable (Prevention Institute, 2018). Part of the reason for locations with health inquity is city planning and grouping of people that do not have opportunities to a healthy lifestyle. These determinants are shaped at the community level, and reflect on the daily lives of it's citizens. Their lifestyle has become a series of unequal opportunities, choices, and access to resources that would allow people to pursue healthy, thriving lives.

"Health equity means that everyone has a fair and just opportunity to be healthier. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness, and lack of access to good jobs, with fair pay, quality of education, and housing, safe environments, and healthcare."
-Paula Braveman, Health Affairs 2017 (Prevention Institute, 2018).

Southern Seattle has the highest encounters of health inequities in the city. The health disparity the area encounters lower their life expectancy by 6.5 years (Center for the Community Health and Evaluation, 2015). Due to the cost and lack of insurance that is associated with healthcare, residents did not visit the doctor, although nearly half identified access to care as their primary need for the population.

Premise for Investigation:

Health and well-being are intrinsically linked to the built environment. This includes both the development of the neighborhoods where people live, as well as the healthcare facility itself. Factors such as education, economics, family and social support, and safety play a factor in the wellness of our everyday lives. Architecture can help these communities develop into a sociocultural environment that minimizes health disparities.

Redefining healthcare typologies and planning methods will lead to the future of wellness. Recently, there has been a shift in primary care needs, to preventitive care needs and a connection to the community. Today, many hospitals and community organizations are combining forces to keep people healthy and out of the hospital, but fall short in addressing the sociocultural and environmental causes of unhealthy behaviors. (Alkan, 2014).

"Health systems are, over time and into the future, are going to take much more responsibility for dealing with the social determinants of health in the service of providing better wellness and better health, not just health. In my view, that's the next frontier." -Bruce Leff, professor of medicine at Johns Hopkins University School of Medicine and director of the university's Center for Transformative Geriatric Research. (Colliver, 2017).

Dealing with the evolution healthcare design, the issues that are presented may need to be adapted for future use. For a large city, a building may need to acquire more beds, storage space for old equipment, or make room for new procedures. The estimate is that healthcare models change every three to five years, architecture can be made adaptable to fit the needs of a changing environment.

Many hospital, clinics, and doctor's offices charge a "facility fee" in their medical bills. This price varies drastically depending on the service and length of stay. The fee is targeted towards clinic staff, supplies, space, and facility operations. Development of a well located, sustainable, and efficient design layout will cut costs of the facility through timeliness, patient focus, effectiveness, functions and maintenance, which can be used to form an affordable healthcare system and improve patient care. After cutting the costs of care for people who can't afford it, continuation of wellness and prevention lies on community involvement and support.

NARRATIVE

Design Solution + Activities:

The typology in which this proposal is represented, will be a clinic and community center. It will specifically address health factors on a local level, and reflect the needs found in the research studies. The design will combine health care access and affordability needs, as well as a space to promote wellness and social connection.

Community health assessments for specific neighborhoods will aid in the research studied at a local level. While programs to battle this cause have taken effect, they are often poorly located to be access by those who need it. While studying the causes of these health disparities, the information gathered will produce the program and spaces needed for the design in addition to the medical clinic.

Research activities for the design process will address efficient layout designs for healthcare programs, cost analyses, as well as green design for environmental efficiency. Research will be conducted on how to best fulfill these goals, as well as what causes health disparities, communities, and how these can be solved.

The location that will be studied is Seattle, Washington, where there is a variety of healthcare systems, but is not well located for the people who need it, leaving them in health disparity. The area in focus will be in southern Seattle, where is will affect the most people. Community Health Needs Assessment studies have shown that this area has the lowest life expectancy, low access to care, highest with diabetes and obesity, low physical activity, little dental care, and located in a food desert (Center for Community Health and Evaluation, 2015). This area is also one of the most diverse in the United State with a large amount immigrants and refugees from overseas.

When conducting the site inventory and analysis, areas of study with include wind, sun, and water runoff to determine where on the site natural elements can be used for sustainable design. The used of green principles can aid in the facility operations and lower the cost of care to patients.

Accessiblility will also play a factor in choosing the best site. Because Southern Seattle has some of the lowest access to care, providing public transportation systems will make it more accessible for patients.

UNIFYING IDEA: HOW CAN HEALTH CARE DESIGN IMPROVE HEALTH DISPARITIES?

Goal: Design an efficient healthcare facility that battles the need to be more affordable, while creating a sociocultural community.

Goal: Combine the needs for a primary care facility and community involvement to promote health and wellbeing. This may also serve as a preventative care model.

Questions for Research:

How can healthcare design be used to create more opportunities to solve healthcare disparities?

How can this be targeted to improve the community environment on a social, environmental, and built level?

Can an efficient healthcare design be implemented as a base model to battle health disparities across the country?

Can we make it adaptable for when technology changes?

PROJECT TYPOLOGY

Medical Clinic + Community Center

Design project will contain primary care needs such as medical, dental, and rehabilitation, as well as a community center to promote wellness and social support.

Precedents for this typology are becoming popular throughout the healthcare industry. The need for community involvement has proved instrumental in promoting healthy behaviors.

Location: Seattle, Washington

HEALTHCARE PLANNING

Functional Adjacencies / distances
Block and Stack
Patient Flow
Staffing Efficiencies
Infection Control
Future Expansion / Flexibility

HEALTH COMMUNITY DESIGN

Clean Air / Water
Healthy Foods
Walkable Environment
Housing and Transit Options
Spaces for Recreation
Safety
Spaces for Socialization

ADDITIONAL PROGRAM CRITERIA:

Patient Experience
Staff Satisfaction / Retention
Sense of Place / Brand
Way finding / Ease of Access
Community Interface

Reference: Perkins & Will A Vision and Planning Framework for Health Districts of the Future

TYPOLOGICAL RESEARCH

Method Types

- Facilities that fit healthcare center, clinic, and community center typologies.
- Medical Centers that feature efficient modeling revolving around patient centered care.

Meridian Center for Health:

Seattle, Washington
Meridian Center for Health is a local clinic and community center promoted to helping the community with affordable care. Community involvement includes housing placement, job training, resume writing, and addressing stressors of health.

Martin Luther King Jr. Community Hospital:

Los Angeles, California
Martin Luther King Jr. Community Hospital was closed in 2007 due to poor quality care and systems. It reopened in 2015 as a state of the art facility and is now one of the leading hospitals for technology in the area. They focus on bringing healthcare to an underserved, low income population, and bring the community back together.

Eastside Health and Recovery Center:

Portland, Oregon
Eastside's health system focuses on combining primary care with transitional housing. Located in a low income neighborhood with a high homeless population, they try to get people back on their feet. To do this, they have drug recovery, temporary housing, and healthcare systems.

Virginia Mason Medical Center:

Seattle, Washington (Toyota Production System)
Virginia Mason Medical Center was losing money based on their hospital program and layout. After adapting the hospital to the Toyota Production System, focusing on eliminating waste in the production process, they were able to get back on track and improve patient care.

MAJOR PROJECT ELEMENTS

Healthcare Design:

Medical Clinic:
The medical clinic will serve the primary needs of the community. This section will include screenings, exams, and medical services. This will include exam rooms, doctor's offices, nurse's stations, reception, waiting rooms, x-rays, lobby, supply and medication rooms, utility rooms, break rooms, medical records, and lab space.

Dental Clinic:
Due to lack of dental care in the Seattle area, patients will be able to reach all their health needs in one location. Spatial programing will be similar to the medical clinic.

Rehabilitation Center
This will be a supporting program within the clinic to continue health needs and prevention. The program will be like the medical clinic and will also include a physical therapy room and therapy garden.

Wellness Center
This will be a section of the facility to promote healthy lifestyles within the community. It will include a track, sports court, and strength and cardio training rooms.

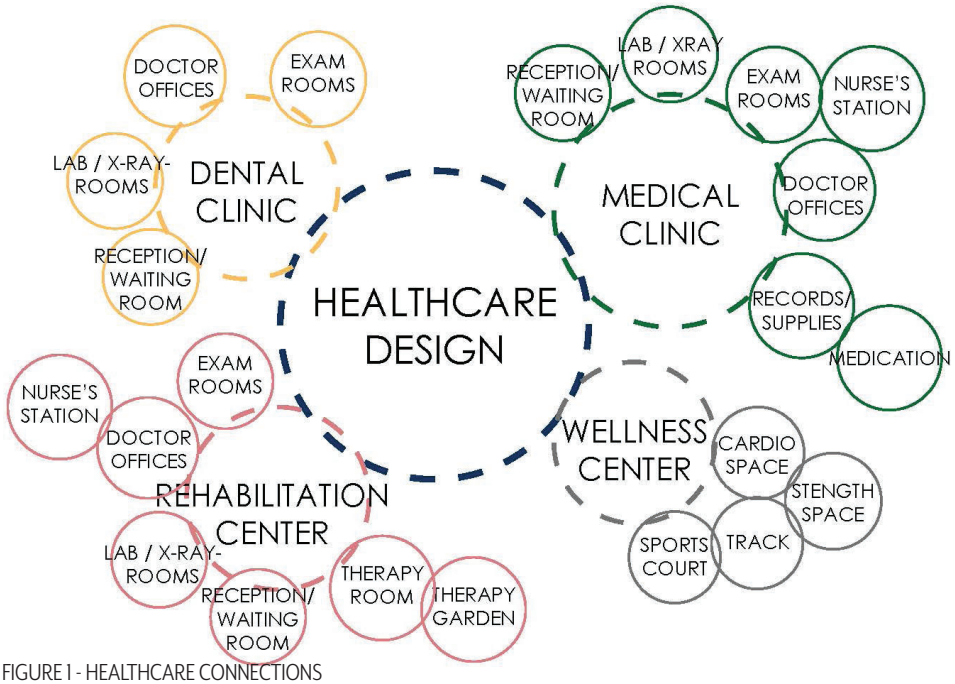


FIGURE 1 - HEALTHCARE CONNECTIONS

Community Center:

Café / Community Garden:
To approach the need for healthy food access, the facility will include a café and food shelter where people in need can come for a daily meal. The garden will play a social factor as well as provide food to the kitchen.

Event Space:
This will be a multipurpose room for community meetings and events. The entry and lobby will be and the front of the space and head into the open room. It will be large enough for renting to other clients to produce revenue. A stage and space for lectures will also be included.

Educational Rooms:
To promote education within the area, classes and teaching programs can be taken here. This program will include classrooms and lab room.

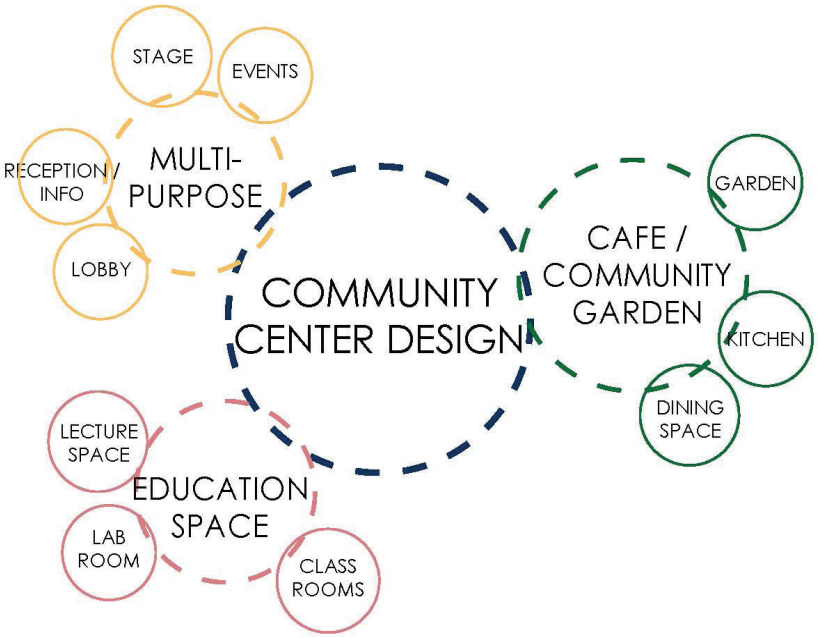


FIGURE 2 - COMMUNITY CONNECTIONS

CLIENT + USER DESCRIPTION

Client:

The clients for the project will be the city of Seattle. While everyone is invited to use the space and programs, it will primarily serve Othello and its surrounding southern Seattle neighborhoods. This is the area that has the most health disparities, such as low-income, diversity, access to health, and education. The community center and medical facilities will be located in the area with the most need to promote health and wellbeing.

Users:

Doctors + Staff:

The first criteria that needs to be met for the employees, is a positive work environment. These are the users that are going to be there all the time, so providing means of efficiency, timeliness, and a break room space will be beneficial for work productivity. Providing spaces for collaboration will promote patient centered care and community for the employees.

Patients:

Patients are the focal point that the design revolves around. They are the backbone to a healthcare facility, and should be treated as the reason employees are there. An efficient healthcare layout will be crucial to the outcome of health and wellness production.

Safety and sanitation will be a key factor to the needs of patients. They are there to recover, heal, and be treated. Having an easily walkable route and way finding techniques will be helpful in the project layout design. Patients will not want to walk far to treatment if they cannot physically do so. Because the site is located in a diverse neighborhood, finding an approach to language barriers and interpretation will help the patients have a positive experience.

Community:

The neighborhood of Othello, in Southern Seattle, will be the primary users of the facility. The social and economic standings of the area show low access to healthcare, lower life expectancy, little physical activity, food desert, and higher diabetes and obesity ratings. Opportunities for education, employment, physical environment, and community involvement promote wellbeing and lower health inequities.

The needs of these users will be a space where social opportunities and promotion of health practices can be provided. Spaces like a wellness center, education rooms, and multipurpose space for meeting and events can promote community interest.

SITE INFORMATION

Seattle:

The city of Seattle is an economical and industrial city, on the west coast. It is the largest city in the state of Washington, and Pacific Northwest region of North America. With an estimated population of 750,000 residents, it is a center of business, trade, and technology with companies such as Microsoft, Amazon, and Google leading the way.

Healthcare in is a prominent economic factor in Seattle, providing jobs and wellness in the city. Approximately every dollar spent by a hospital supports roughly $2.30 of additional business to the community (Robin Guenther, 2008). Because Seattle is the largest city in the Pacific Northwest, other states such as Alaska, Idaho, and Oregon come to seek treatment.

Southern Seattle is a place of diversity, culture, and residential areas. However, it is also filled with health disparities. To designate the location of my site, I will be analyzing the following criteria:

1) Where is healthcare access and community involvement most needed?
2) What are the health factors located in that area?
3) What are the social issues being faced?
4) Where is it the most accessible for the most people?

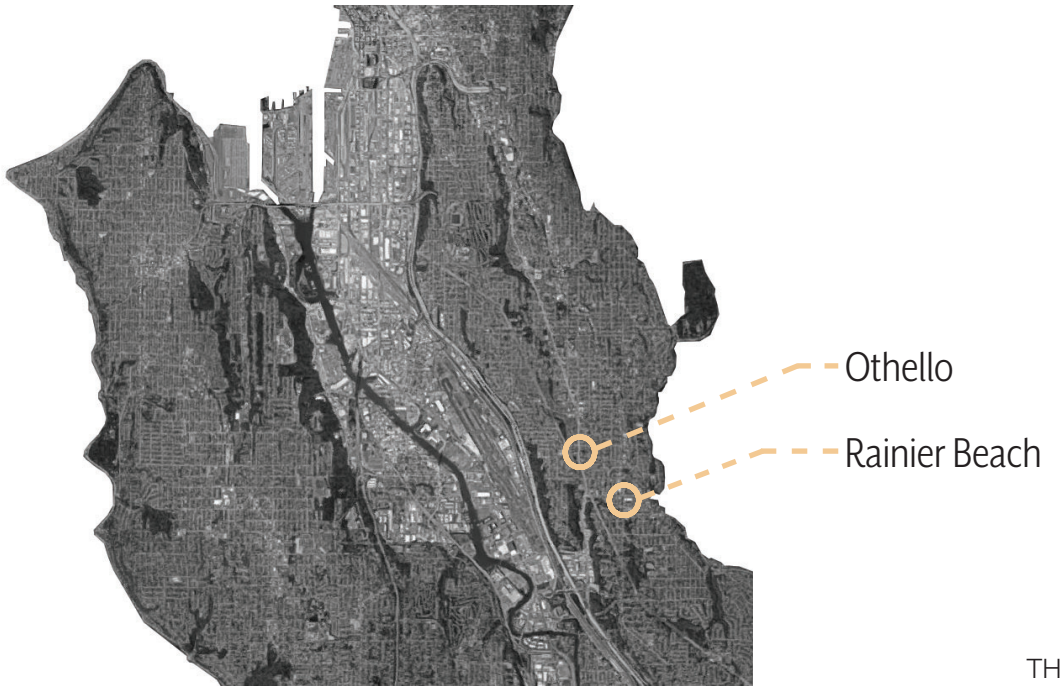


FIGURE 3 - SOUTHERN SEATTLE (GOOGLE MAPS)

SEATTLE, WASHINGTON

Diversity:

In King County, the life expectancy varies by race and ethnicity, as well as location within the city. In recent years, ethnicity has shifted from neighborhood to neighborhood, currently focused in the southeast vacinity.

Theses are a result of health disparities and pushing people towards communities where they do not have the same opportunities to be healthy.

Life expectancy is lowest in the downtown, central, Delridge, southeast, and northwest neighborhoods by as much as 6 ½ years compared to other areas.

Lack of Healthcare Access:

The local and national economy since 2008 has left many people in Seattle without employer supported health insurance and other insecure about their financial wellbeing. Lack of health insurance has caused many citizens to go without care and screenings when needed, and do not get preventative care before illness and chronic conditions.

In Southern Seattle, citizens listed access to primary care as their top necessity (Center for Community Health and Evaluation, 2015).

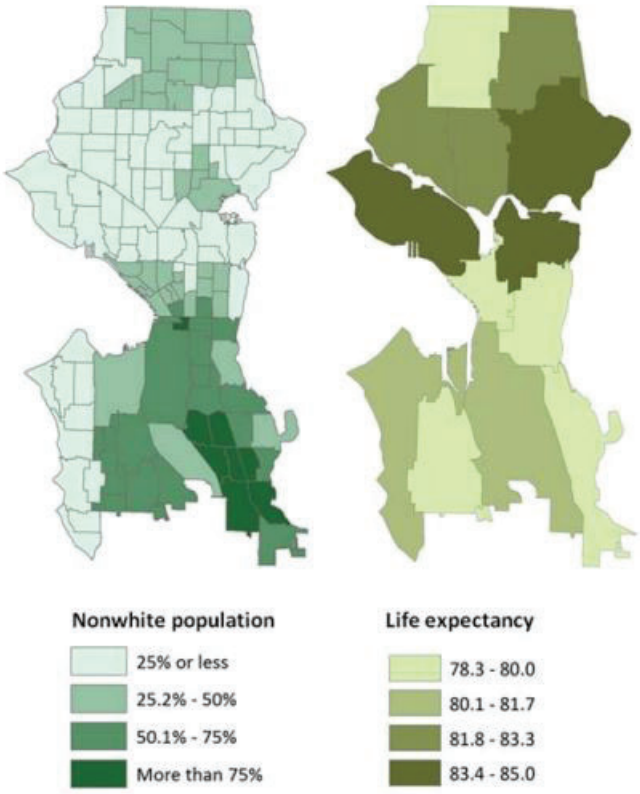


FIGURE 4 - DIVERSITY IN SEATTLE

Obesity and Physical Inactivity:

While diabetes rates have remained stable, there has been an increase in obesity population and physical inactivity. Obesity is most common in north and southwest Seattle, while southeast Seattle has the highest rating of physical inactivity.

Disparities of Healthy Food Access:

Residents in south and north Seattle neighborhoods have fewer opportunities to eat healthy foods. There are fewer farmers markets, and part of the Delridge community in south Seattle is considered a food desert because it lacks convenient access to affordable, healthy foods.

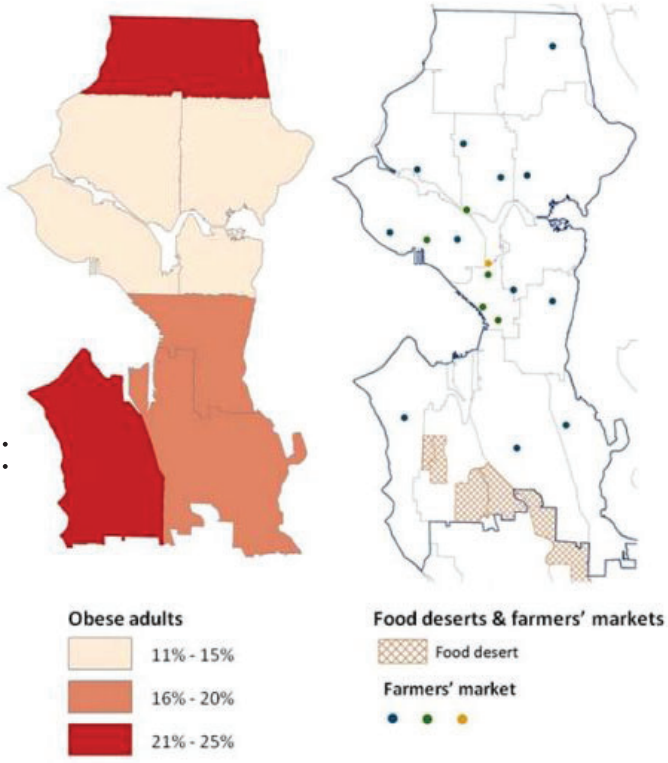


FIGURE 5 - SEATTLE HEALTH OBSTICLES

Solutions:

Health disparities cause many residents to need healthcare, but can not access it due to location, lack of transportation, and cost of care.

Providing a local clinic and community center within a neighborhood that revolves around health inequity with by the focal point of the project.

Research will include demographics of the site, city wide and small scale, income level, access to education, food stores, and transportation systems.

SEATTLE - OTHELLO

Site Selection:

This site was chosen due to its central location within a health disparity. Located in South Seattle, it is with close proximity to low income housing and a large amount of diversity within the area.

For site one, the light rail exits directly onto the site, leaving a large opportunity for public transit to a healthcare facility. Site two has close proximity to the light rail as well and is centrally located within South Seattle to be accessed by a variety of neighborhoods.

Design Goal:
Create a community identity using cultural diversity and central location as guides to the design context.

FIGURE 6 - OTHELLO SITE (GOOGLE MAPS)

SEATTLE - RAINIER BEACH

Context:

Rainier beach was chosen for its location within a health disparity, as well as proximity to a food desert. The site chosen is along a bus line and light rail for transit access and within a quarter mile on a light rail stop. This site would benefit the neighborhood as there is little healthcare access, opportunities for multiple areas of green space and physical activity.

Design Goal:
Develop the community along the bus line to provide a sense of identity. Create a connection to the nearby bay and green space to promote physical activity, health, and wellbeing.

FIGURE 7 - RAINIER BEACH SITE (GOOGLE MAPS)

PROJECT EMPHASIS

1) Create an efficient and sustainable healthcare design to make it more affordable for the community.

The users within the community identified access to healthcare as their primary need (Center for the Community Health and Evaluation, 2015). While many people desire healthcare, many cannot afford it. Ensuring that the opportunity for everyone to get the care they need is the primary goal.

2) Promote community involvement.

Health disparities within the community can be solved through health districts. A health district is a community that promotes the prevention of health issues before they are a problem. Research of the causes of health disparities will aid in the program elements and functioning of the community.

3) Make the design adaptable for future use.

Studies have shown that the healthcare design model becomes outdated every 3-5 years due to the updates in technology and needs of the community. Designing a program model and layout that can be made adaptable to fit the changes of the future would be beneficial to the construction of the facility. Changes may include: bed numbers, equipment, storage, etc.)

UNIFYING IDEA: HOW CAN HEALTH CARE DESIGN IMPROVE HEALTH DISPARITIES?

GOALS OF THE THESIS PROJECT

Academic Goals:

Research and processes will be the focus of my design. Using different methods of information will provide a better understanding of the thesis topic. I will be learning new programs such as AnyLogic, a program for modeling circulation and efficiency patterns, and GIS modeling. Precedent research that pertain to the topic, typology, and business model, and evidence will be a guide towards the design conclusion.

Creating a new model for healthcare design is an issue that I believe needs to be solved. My goal is to make an efficient model that can be moved forward into a variety of situations and locations. It is not only Seattle that has issues of healthcare, but many communities around the country.

In an ever-changing society, we face the updates in technology as we move towards improvement. Healthcare models change constantly, the model needs to be adaptable so that it can be implemented for years to come.

Professional Goals:

The objective for my thesis project is to create a base model that can be used in health disparities around the world. Raising awareness to the issues throughout communities may help us form a stronger healthcare system and society.

Providing context and idenity for people without a sense of community will drive the design. In a community where culture is an important aspect of daily lives, creating a sensitive design model that benefits everyone will need to be considered as part of the solution.

As an architecture student interested in healthcare and community design. I hope that I can learn from my research and bring it to my future projects in professional setting.

GOALS FOR THE THESIS PROJECT

Personal Goals:

My goal for this project is to gain a better understanding in designing a healthcare facility, learning about the cost and production of the architectural systems, and present my thesis in a way that benefits the community.

With close family being part of the healthcare industry, it was a common topic around my house and became a personal interest of mine. I would like to take part in what my family does and see if what I do could benefit them. I would be interested in hearing about the product from their perspective and seeing if the model being researched would work for the people who would use it.

Sustainable architecture has always been a passion of mine. I look to the site for inspiration and try to use the natural resources to benefit the design. In my thesis project, I will be looking at how sustainable design can influence cost and operational systems in addition to the environment.

PLAN FOR PROCEEDING

Definitions for Research Direction

Theoretical Premise - Unifying Idea:

1) Precedent Research for Healthcare Business Model:
The model for running a healthcare facility, operations, and maintenance for production must be understood to define affordable healthcare. Green building techniques may be used to lower operation costs, which could be directed towards patient costs. "Facility Fees", which cover technology and operational costs, are often found on medical bills can range drastically depending on services and rooms being used.

2) Precedent Research of Efficient Design Models:
There are many different versions of the healthcare models based around nursing stations, decentralized or centralized, timeliness, circulation, and efficiency. Finding a version that will work best for a compact design, focused on patient needs will be the goal of the model. A secondary goal would be making it adaptable for future use when needs of the facility change. I intend to use AnyLogic, as a program for modeling circulation and efficiency patterns through the design process.

Project Typology:

1) Precedent Research for Healthcare Facilities and Community Involvement:
Wellness within the community can be hard to measure. Researching the factors that form a healthy community and issues that are existing, will define the process towards proficient health. Precedents that already have a combination of community center and clinic will help in developing the program of the project.

Historical Context:

1) Define the need and intention of the design in the chosen location.
2) Research the social and cultural needs of accessible healthcare in Seattle on a large city scale, and small neighborhood scale.
3) How can the impact of a healthcare and community center impact the lives of the community?
4) What zoning and community goals have been set for the neighborhood in future design planning? What has the intention been in the past?
5) Because Othello is a diverse, cultural community, research on the history of cultures and demographics within the neighborhood may impact the needs of the community.

PLAN FOR PROCEEDING

Site Analysis:

1) Site Inventory:
Defining the site will depend on different aspects of the site context, such as green space, tree cover, sun movement and patterns, wind direction, and lighting. This may suggest where the building is located on the site to have the best outcomes for health and wellness. Because part of the project will include green space and environmental connection to the community, having the right location to promote wellbeing is beneficial.

2) Transportation and Surrounding Context:
As accessibility is important to healthcare, the site must be well located to a variety of transportation options. Othello Square is located adjacent to the light rail system and can bring people to the site from both the North and South directions. The surrounding context will also play a part in the need of the community.

3) Sustainable Design:
Promoting green design will be influential in the construction and operations of the healthcare facility. Using the natural elements as alternative to mechanical systems will lower costs for the facility as well as the patient. Locating the best locations for water runoff, wind, natural lighting will influence the systems used throughout the facility.

4) Healing Environment:
Using components from the natural environment can promote healing and wellbeing. If used throughout the building, natural materials and connection to the environment may help patient health.

Program Requirements:

1) Efficient Healthcare Model:
While every healthcare facility has specific goals that influence their work with patients, providing a space for physicians and staff to collaborate will help with patient care. The design should revolve around the patient's care and needs to create quality care. When the model is more efficient, hospitals are able to save money that can be focused towards affordable care.

2) Community Center and Involvement:
Healthcare today is moving in the direction of preventative care and wellbeing. The idea that health takes place outside of the facility is a bridge to connect the community to better care. The design should be a place where people go to heal, as well as when they are well.

Design Methodology

Unifying Idea:

How can healthcare design be used to battle health disparities?

To find a solution to topic, precedent studies, quatitative data, and the testing of new ideas and tools will form the research conclusion.

Precedent Research:

To form the program, efficient production methods, and healthcare operations. I will study how the research was proposed as a viable option, the purpose, and context that required a new solution. The research will also include how a healthcare buisness is managed to produce support spaces, and what the patient is charged after a visit promote affordability within the system.

Quanitative Data:

Quanifying the data necessary for research conclusion will be found through GIS mapping, AnyLogic modeling, and demographic research of the community on a city and neighborhood scale.

GIS mapping will allow me to identify the locations where health disparities are located, where healthcare can be the most productive, and how it can be accessible to all users. AnyLogic will measure the efficiency of the proposed solutions to come to the best conclusion. To use either of these programs, demographic data will have to be calulated to see what needs are the most common and where they are located. This will be found through city planning information and offices.

Qualitative Data:

Qulitative data and quantitative data will be produced simaltanously to discover where or not the proposed solution will work, socially acceptable in the community, and if it meets the goals of the clients and community. Both qualitative and quantitative data will be used together to form concise design decisions.

PLAN FOR PROCEEDING

Documentation of the Design Process

Medium for Investigation:

- Hand Sketching and Modeling
- GIS Mapping
- AnyLogic Software
- Revit Digital Modeling

Programs for Production:

- AutoDesk Revit
- Adobe Illustrator
- Adobe InDesign
- Adobe Photoshop

Design Preservation:

- Scanning and Process Documentation.
- Progress Reports with Advisor.
- Note, sketches, and models dated and referenced throughout design iterations.
- Thesis research and progress updated updated annually within book.

Collection Intervals:

- Weekly updates of progress and production per method of research.

Presentation Methods:

- Adobe Premiere Video
- Powerpoint Presentation of research, methods, iterations, and solutions in chronological order.

Material Publication:

- NDSU Thesis Repository
- Project Book with research and solutions.

Scheduling of Events

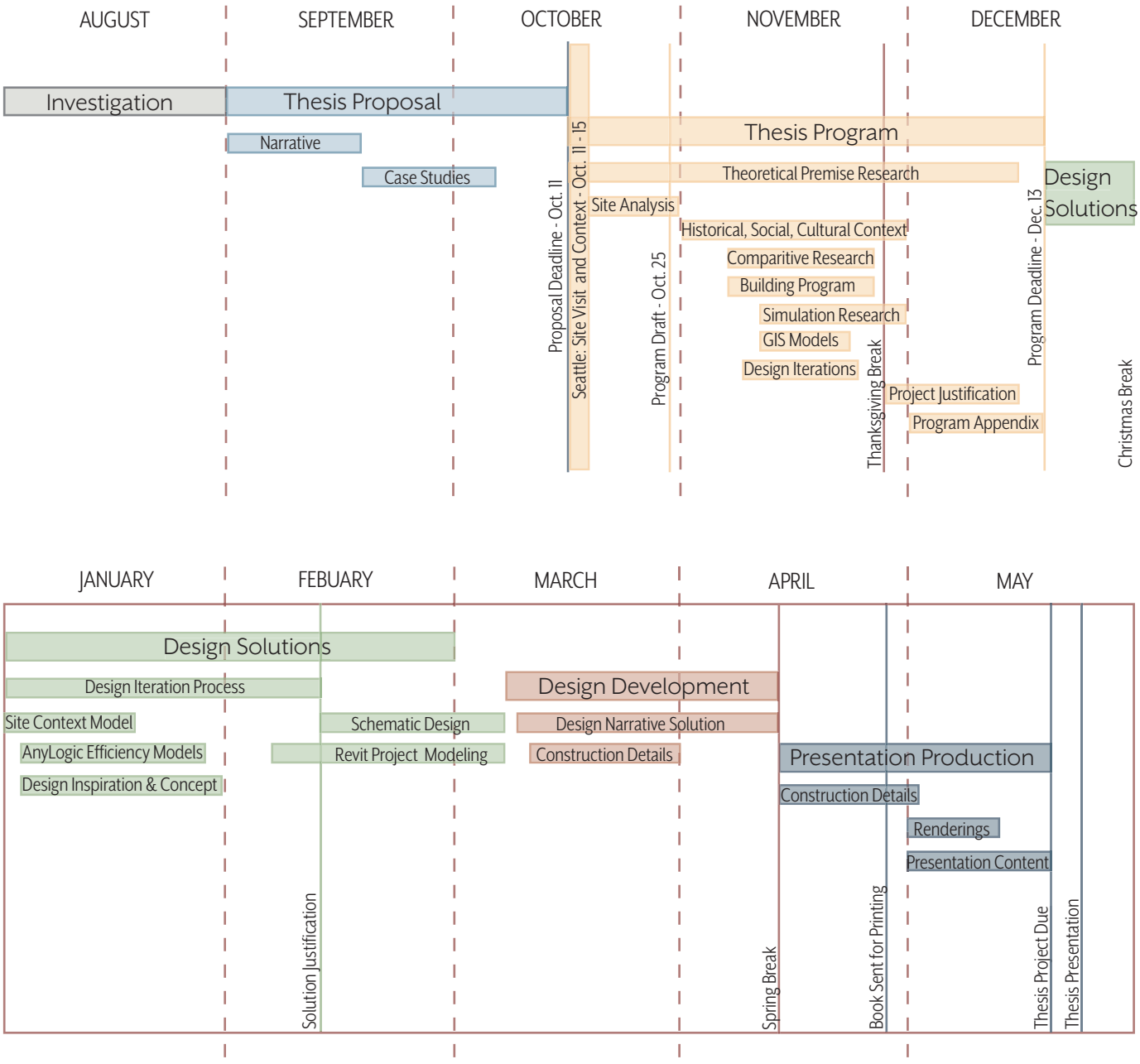


TABLE 1 - SCHEDULING OF EVENTS

THEORETICAL PREMISE

How can healthcare design repair health disparities?

In today's society, we have recognized that health inequity is a prolonged problem that needs to be addressed. While many organizations have integrated community services with medical facilities, they fall short in recognizing the determinants of health that lead to inequity. Developing a program that uses social and health determinants as a guide for designing a healthcare facility will create more opportunities to promote health and wellness within the community.

The topic of research will include designing an efficient healthcare facility that addresses the need to be more affordable, while creating a sociocultural community. The design will combine the needs for a primary care facility and community integration to promote health and wellbeing. This may serve as a preventative care model that helps people take initiative of their own wellness and provides opportunities health equity.

To program the facility, research will be conducted to define what health inequities are present in Seattle's Rainier Beach community, and what types or spaces and uses would give the residents more opportunities to live healthy lives.

UNIFYING IDEA: HOW CAN HEALTH CARE DESIGN REPAIR HEALTH DISPARITIES?

Goal: Design an efficient healthcare facility that addresses the need to be more affordable, while creating a sociocultural community.

Goal: Combine the needs for a primary care facility and community involvement to promote health and wellbeing. This may also serve as a preventative care model.

RESEARCH FINDINGS

Improving Health Inequity

In 1946 and 1948, the Constitution of the World Health Organization and the Universal Declaration of Human Rights recognized that health is a fundamental human right and cannot be separated from other human rights. The Constitution declared that "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition" (World Health Organization, 2001). By establishing that health is a combination of physical, mental, and social well-being, rather than just the consequences of disease or injury, it acknowledges a view into the future of health and it's impact by the environment.

"Health equity means that everyone has a fair and just opportunity to be healthier. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness, and lack of access to good jobs, with fair pay, quality of education, and housing, safe environments, and healthcare."
-Paula Braveman, Health Affairs (Prevention Institute, 2018).

FIGURE 8 - RAINIER BEACH PEDESTRIAN ZONE

Determinants of Health

Many factors that define a person's health come together to determine the health of the community. These determinants are shaped by the circumstances where people live, work, grow up, age, and the systems put in place to deal with illness. Some of these findings are based on the state of the local environment, economy, genetics, income, education level, access to healthcare services, and their relationship between friends, family, and the community.

Not everyone has the same opportunities to achieve good health. Many communities are left in areas of "health inequity", which is the state of avoidable, unfair, and remediable differences among groups of people, often defined by social, economic, demographic, or geographic circumstance (World Health Organization, 2001). Because these areas are left in disparity, heart disease, mental illness, cancer, diabetes, obesity, and other illnesses occur more often.

The determinants of health are interconnected. It is hard to address one without addressing another. For example, lack of economic development effects the sociocultural and physical environment opportunities that allow people to take an active role in their health. Education is also a determining factor, higher education can influence a person's health knowledge, employment or income, and social networks (Prevention Institute, 2018).

PHYSICAL ENVIRONMENT

SOCIAL ENVIRONMENT

EDUCATION

EMPLOYMENT

PUBLIC SAFETY

HOUSING

ACCESS TO CARE

RESEARCH FINDINGS

Environmental Determinants of Health

Socio-Cultural Environment:

The environment where people live refers to the community, and interactions between their norms and culture. Studies have shown that when a person is more involved with the community, family, civic life, and culture, they are more likely to experience positive health outcomes (Prevention Institute, 2018).

Social status often plays a role in the health of a community. Areas of poverty and ethnicity are often found to have the highest levels of disparity, sometimes due to city planning or affordability.

Physical Environment:

The physical environment refers to place, geography, and access to both natural and human made components. Some factors are natural, or pollution caused, such as poor water or air quality and open space for physical activity, while others deal with the access to healthy foods, transportation, and safety of a neighborhood.

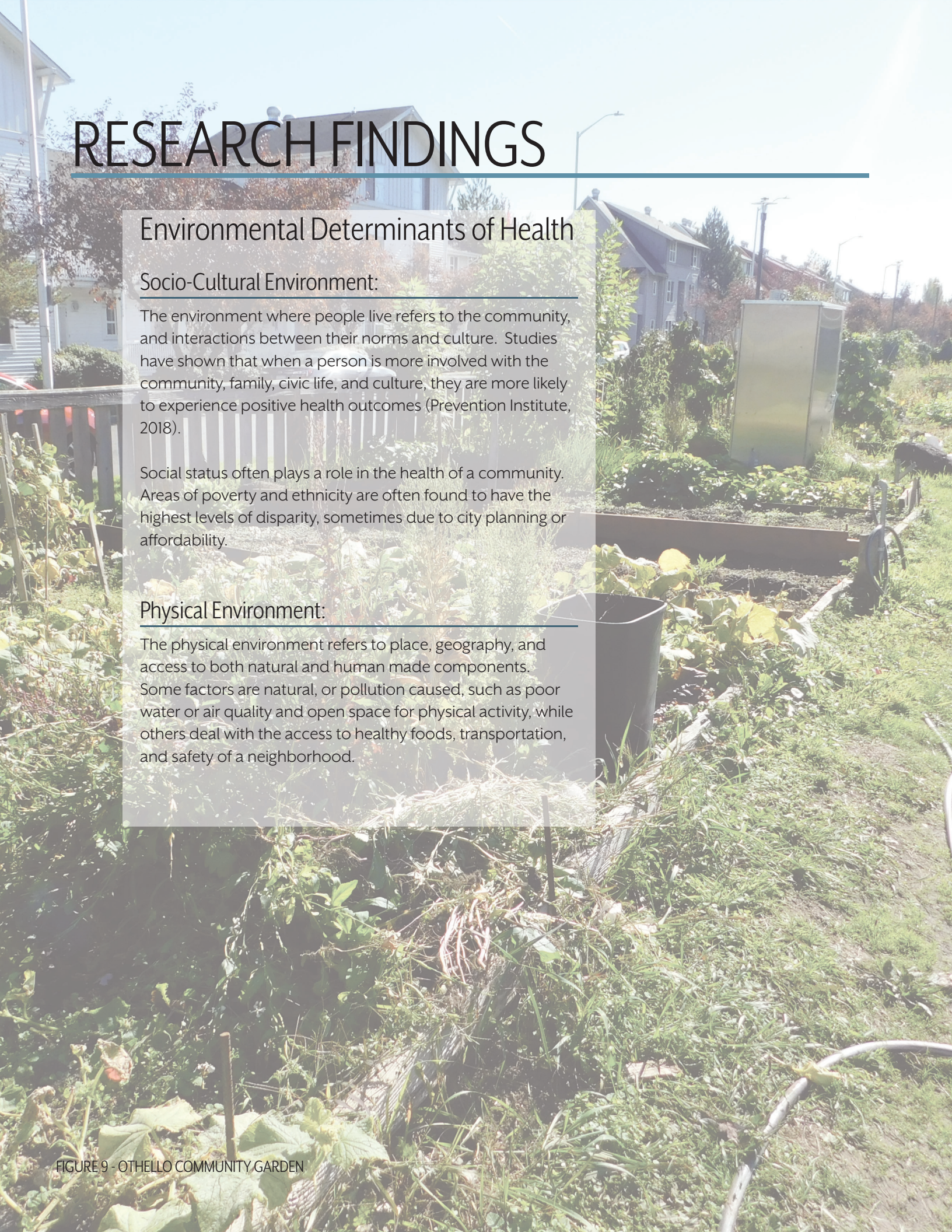


FIGURE 9 - OTHELLO COMMUNITY GARDEN

Defining Health and Wellbeing

The World Health Organization defines health as "a state of complete physical, mental, and social well-being" (World Health Organization, 2001). These aspects are both features of the person's self and body, as well as how they are affected by their environment.

Well-being is more subjective than health, because it stems from a person's comfort and happiness. Overall health deals with a person's body, and the absence of disease or injury, while well-being combines that with a person's satisfaction and experiences around them. Someone's engagement with the community and surroundings show a characteristic of a positive sense of one's self (Steemers, 2018).

Designing for Health and Wellbeing

Architecture for health and wellbeing, is fairly new aside from the design codes needed by ADA requirements. By dictating a more holistic approach, we can develop characteristics of health prevention and define the future of healthcare. The "Foresight" project created by the UK Governement, defines the "Five Ways to Well-being" as social connection, keeping active, taking notice, learning, and giving (Steemers, 2018). These same principles can be correlated with the determinants of health and how they translate into health outcomes and behaviors.

The results from the project show that a space for people to connect is a source of well-being for individuals and the community (Steemers, 2018). By accessibility, and proximity to alternative resources, people are more likely to interact with one another. Many of these spaces can be adaptable, or multifuctional where the user can define what the space is used for.

By making these spaces more accessible, they can also become active. Physical activity is correlated with good health and the reduced opportunity for disease. If people are able to walk or bike to their location, they are more likely to take notice of the environment around them. People are drawn to open spaces, nature, art, and seating areas. These can provide a wide assortment of private to public spaces that suit the user's needs.

Education is a key point in engaging the community. Because many different determinants of health are interconnected, education can effect a person's employment and income, health knowledge, and social network. While some neighborhoods do not have quality educational opportunities, providing a space for residents to take additional classes or share their knowledge with others can be beneficial to one's wellbeing. These activities may include art, music, or evening classes for all ages.

RESEARCH FINDINGS

The Built Environment and Human Health

In the 19th century, healthcare was focused towards treating infectious diseases, such as small pox, tuberculosis, typhoid, pneumonia, and rubella, that were responsible for most of the deaths at that time. Many of these conditions spread due to poor housing conditions, overcrowding, little access to fresh air and light, lack of drinkable water, and waste. Almost every family lost someone close during that time. The strategy used to prevent this was controlling environmental and clinical public health, while making changes in urban planning and zoning. They saw the daily effects of unhealthy urban environments and sought a solution to changing health outcomes (Gunther, 2008).

Moving forward into the 21st century, chronic diseases became more common. While we have developed protocols and medical structures to deal with reoccurring issues, integration of urban planning, architecture, medicine, and public health are still necessary towards preventative care.

Infrastructure improvements would not have been possible if the professions had remained isolated. Before health and well-being took an integrative approach, each profession focused on different aspects without consulting one another for the best outcome. According to public health advocate, Richard Jackson MD, MPH, "Doctors had to care about sewers, architects about sunlight, and politicians about public health accountability" (Gunther, 2008). Now that professions are partnering for better community health, contributions are credited towards better housing, nutrition, water, workplaces, and immunizations.

Urban planning and public health are linked by the correlation between the social and economic problems of today's health and the local environment. Widening disparities in health are caused by social environment, such as race and economic status, and play as large a role as physical environment.

Urban planning in healthcare focuses on how the built environment effects health and wellbeing. Poorer neighborhoods tend to have fewer doctors and pharmacies, inadequate transportation options, and fewer, safe and convenient recreational opportunities. Even if a person was motivated to live a healthy lifestyle, social determinants within the community make it harder than if they lived in another equitable area. (Institutue of Medicine, 2001).
According to the Center for Disease Control and Prevention, studies show that environment account for 30% of premature deaths, with health behaviors and lifestyles around 50% (Institutue of Medicine, 2001).

With today's society requesting a change for health and wellbeing, reevaluating the design of our built environment may affect our health, wellbeing, and quality of life.

The Environment and Medicine

"Human health cannot be treated separately from the natural environment." (Gunther, 2008) Even in the 4th century B.C.E., Hippocrates knew that medicine and public health were linked. The shift from medicine's "cure" for sickness to "prevention" calls for a new model that brings both environments together.

Over the last 60 years, medicine has evolved into a technological and clinical campus icon, focused on curing disease. These advances have become specialized and concentrate on the goal of individual patient outcomes but have often disassociated health from environmental health issues.

"Environmental health is the study of the complex interrelationship between the natural, social, and built environments, and how they create conditions for health and disease, says Samuel H. Wilson, M.D. (Gunther, 2008).

A person's health is a reflection of their environment. While some communities offer many amenities for healthy living, others do not have the same opportunities. A person's biology can impact their susceptibility to their surroundings, and when those surroundings are poor, they may be prone to disease, injury, or low health outcomes.

Throughout the 20th century, the practice of medicine, public health, and ecology have been placed on separate paths. Clinical health has been focused on diagnosis, treatment, and cure, with disregard for prevention. With human health shifting needs from infectious diseases to chronic illness, medicine must define the relationship between community health and health of ecological systems. Healthcare systems need to find ways that change the population health sector by concentration on the determinants of health, in addition to individual health.

To create a new path forward for healthcare, ecological medicine may pave the way. It is a call for action "to reconcile the care and health of ecosystems, populations, communities, and individuals" (Gunther, 2008). This method is a two-part system. First, medicine must establish conditions for health and wholeness that may prevent disease and illness. The second goal is to cure. This system is almost reversed from today's primary goal of "curing" and individualistic medicine. By treating prevention as important as cure, it embraces the environmental nature of health and addresses the need for community involvement.

LITERATURE REVIEW

Summary

As a society, we are facing a shift in healthcare needs by the population. We are moving from a process of "cure" motivation to illness prevention and wellbeing. This leaves us with addressing where the healthcare model needs to go in order to produce the best health outcomes for the population.

The articles chosen for review address the how we can form a greater community for health outcomes by addressing the determinants of health and implementing them in our designs, as well as what it takes to put those designs into action efficiently. The following questions were considered as criteria to consider before developing the design:

- How can the determinants of health be a consideration to the design of healthcare facilities and improve health and wellbeing?
- What is the future of healthcare?
- How can a healthcare model be designed efficiently to eliminate waste, as well, becoming more affordable to the public?

How can the determinants of health be a consideration to the design of healthcare facilities and improve health and wellbeing?

Health and wellbeing are linked to the environment. While this is the base for the how your health and wellbeing develops, not everyone has the same opportunities to live healthy lives. We have an increasing focus to putting funds towards healthcare facilities that do not address the local needs of the population and focus on cure rather than prevention. While healthcare facilities will always be needed in the community, there may be a greater way to implement them for a better result that shows mitigation of health inequities.

What is the future of healthcare?

The healthcare model is continually changing due to the advancements in technology and patient health. By programming spaces that can be changed for future use, or making them more flexible, we can design the facility to fit the needs as they change. Some of the challenges we face for the future are the increasing population, Seattle in particular has seen a large amount of growth within the city. The population is also aging, as the "baby boomers" require more access to healthcare. Providing access to services that treat and prevent chronic disease will lead us to a new healthcare model.

This shift to preventative care has led to a partnership between healthcare facilities and community involvement. Today, we are seeing an increase in hospitals partaking in continuing education, food shortage and supply, local art installations, transportation services, and job training. These are a few of the programs that can be added to a healthcare center that supports community integration.

How can a healthcare model be designed efficiently to eliminate waste?

There are many considerations taken into account when designing a healthcare facility. Different departments require different needs to suit the function of the space. When designing the layout of the facility, grouping spaces by department and then their overlapping functions allow you to eliminate wasted space and duplication of services. Some patients have multiple symptoms that require assessment by many different clinical departments. These overlapping spaces also become a source of integrative care when the whole staff works together to solve a problem or diagnosis. For example, a patient may need to be seen by both a radiologist and orthopedic specialist for a broken bone. These spaces allow them to consult one another for a diagnosis and plan for treatment of the patient.

This system also works as part of the public space. Administrative services, retail, food services, and waiting area are all found near the entrance of the facility. This space becomes a buffer and connecting point to introduce the community center addition to the design as the spaces integrate and overlap.

Combining all of these questions into one design is the goal of this thesis project. By integration of spaces and programs, we are able to address the determinants of health in a local setting to reflect the direct needs of the community. When the design is done in an efficient manner, we are able to eliminate waste and lower the cost that is a reflection of the facility fees patients are charged with when they need treatment. The facility may then promote better healing outcomes and become a space to go when one is ill, as well as when they are well.

A VISION AND PLANNING FRAMEWORK FOR

Changes in Healthcare

Across the United States, we are experiencing an increase in rates of obesity and chronic disease. The socio-economic and environmental factors of our community influence our behaviors towards health and wellness. Clinical care, or healthcare, accounts for around 20% of health outcomes, yet almost 90% of health spending goes towards treating preventable chronic diseases that are caused by unhealthy behaviors.

Addressing the social determinants of health such as access to quality education, walkability, social and community support, access to healthy foods, and physical activity shift our healthcare model from sick care to preventative care and health promotion.

Healthcare systems will always be needed in the community. The American Hospitals Association estimates that they are often the largest employer within a city and create an additional $2.30 of business activity for the community. With cost of care continuing to rise, hospital systems are now partnering with community organizations to provide low-cost disease prevention and health promotion services, such as screenings and educational programs. Other programs include local purchasing, job development, and neighborhood revitalization to provide community outreach.

Economic and demographic findings drive the change for healthcare delivery. Currently, the payment model is “fee-for service” (F.F.S.) which reimburses the provider for each visit by a patient, even if they become worse. The most common form of payment is through insurance, but this may not cover all expenses, or the patient may not be able to afford insurance and disregards the need for care.

The term “provider-centered care” is used to indicate that the patient is unable to take part in their health outside the hospital. This model is no longer featured throughout healthcare systems and is moving towards patient-centered care. This system focuses more on efficient, evidence-based prevention, wellness, and personalized care for the patient. The Affordable Care Act accelerated this shift providing incentives for integrated care models under Medicare programs that offer improved health outcomes for a defined population.

This highlights a problem with current structures. While patient focused design has been implanted throughout facilities, it has yet to address the needs of community members and residents.

HEALTH DISTRICTS OF THE FUTURE

PERKINS AND WILL, 2014

Future of Medical Facilities

"The future of the hospital can't be the building on the corner or down the street. It's got to be immersed in the daily culture of the community that it serves" said John Bluford, CEO of Truman Medical Center.

Within the last decade, many hospitals have been sponsoring low-cost, high-impact programs such as farmer's markets and recreational trails to connect their communities with health and wellness. Café's and stores are becoming more common to create retail or a multi-purpose aspect to the facility.

The beginnings of healthy community design rely on small block, walkable streets, active ground floors, and green spaces. Adding these features to healthcare design is only the beginning of connecting to the community. The overarching goal is to create a healthy place to heal, work, learn, and live by design.

Community Health Rankings

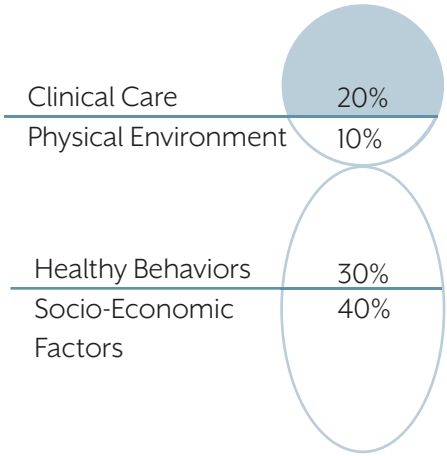


FIGURE 10 - COMMUNITY HEALTH RANKINGS

The figure above shows one example of how healthcare and the environment play a factor in a person's overall health. Because behaviors and socio-economic factors are the largest portions, differences in a community's opporunities for healthy lifestyles leave many places in health inequity and lower qualities of health.

Accountable Care Organization Model

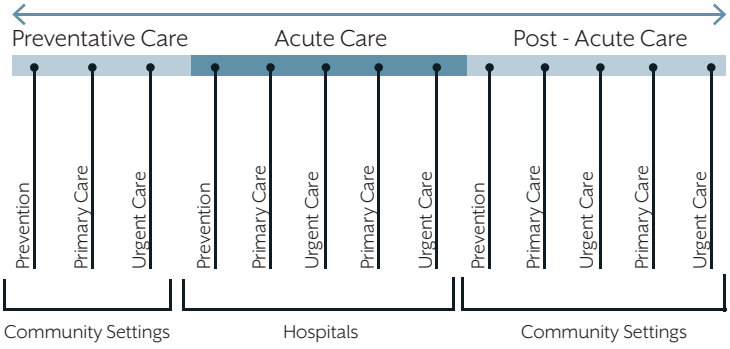


FIGURE 11 - ACCOUNTABLE CARE ORGANIZATION MODEL

While hospitals and health systems in the past have been primarily focused on acute care, this figure shows how providers can provide greater patient care to the entire conitnuum. This thesis project will focus primarily on preventative care and the determinants of health that may coordinate with it.

A VISION AND PLANNING FRAMEWORK FOR

Health Districts

As a result of the Affordable Care Act, the United States healthcare industry is moving away from fee-for-service payment models towards a new system. Today, the industry shifts towards preventative care and health population management by including low cost, community-based services.

A "health district" is a place where investments are targeted to improve healthy behaviors and health outcomes. Using the term "health" instead of "medical" is used to shift away from a medical campus, which focuses solely on treatment of sick patients, while the health district will target preventative care and integration of services into the community infrastructure.

The proposed design of the future will integrate "4 P's" of Health District Planning. This framework focuses on population health, place, partnerships, and performance. These principles reflect the ideals that social determinants impact the health needs of the community.

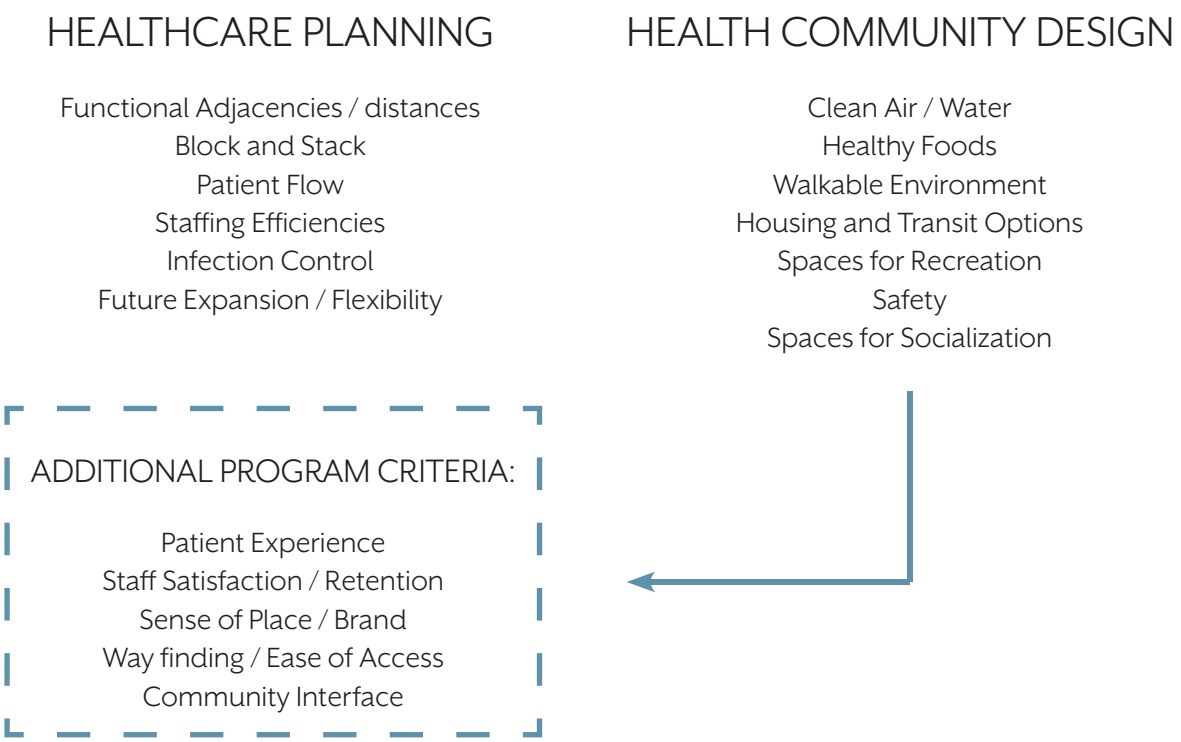


FIGURE 12 - HEALTHCARE VS. COMMUNITY DESIGN

HEALTH DISTRICTS OF THE FUTURE

PERKINS AND WILL, 2014

Population Health

Population health revolves around the idea that all citizens should have equal protection from disease and injury. Each facility should specify the health outcomes and distribution of individuals within the area and reflect the needs of that group. The National Prevention Strategy aims to "improve America's health by helping to create healthy and safe communities, expand clinical and community-based preventative services, empower people to make healthy choices, and eliminate health disparities". This goal has led to healthcare and community facilities joining forces, providing the best outcomes for the population.

By using Community Health Needs Assessments, Health Districts may implement the needs of the community and use social determinants to define the space and program requirements that eliminate the area's heath inequities. When an area is medically underserved, clinical care is the primary service, but community programs such as local purchasing, educational programs, and job development are the most common additions.

BALANCE

Health districts should provide flexiblility for healthcare systems to remain economic and social anchors of the community, but it should be balanced with the community's determinants of health needs.

HEALTH FOCUS

The districts should activate paths of a sidewalks and trails to form a well-connected network and promote physical activity. Streets should be activated with multipurpose uses that bring in pedestrians and surrounded by open space.

ACCESSIBILITY

Health districts should create walking and public transit routes throughout the community for all users of ages or physical abilities. Services should also be made accessible to those in need reguardless of economic or social status.

VITALITY

The districts should build partnerships with other community programs, esspecially with key institutions and assets when planning and implementing into communities.

A VISION AND PLANNING FRAMEWORK FOR

Focus on Place

Place focuses on the context of how built environment supports or denies opportunities for healing and healthy lifestyles within the community. Physical determinants such as segregation of use and disconnected streets meet with social determinants of physical activity and food deserts to dictate how the community can be developed. The goal is incorporate both the healing aspects of healthcare provide more amenities for healthy living.

The design of the facility also reflects the location and site. On the interior, elements such as natural daylighting have shown to promote healing for patients. On the exterior, large parking lots degrade walkability, while cars have made locations less accessible for those who rely on public transit.

Health District Planning, when focused on place, often correlates with urban planning. A clear set of goals for community integration are needed to promote health equity and lifestyles. The goal is to find a balance between the operational needs of medical facilities with the quality of life for patients, families, and residents.

Performance

Medical practices have a set program of protocols and treatment of patients to provide the best possible care. Health Districts are following a similar set of evidence-based design and case studies to come to the conclusions of how healthcare can be developed to improve the community. While Health Districts are being developed now, it was not an idea that was previously implemented, and new research must be developed to find the best result.

The areas of study include: innovation in healthcare, health education and research, healthy places, and emergency preparedness. When these aspects are considered on both the healthcare side and community side of the spectrum, they care be implemented together to form healthy living neighborhood.

Partnerships

Partnerships are a necessity when faced with improving population health and participate in place-based initiatives. Healthcare facilities may be faced with not knowing what the community needs or unable to provide transit. They would need to partner with the local government or city transit services to reach a similar goal. When addressing the need to be more affordable, many healthcare facilities have partnered with non-profit organizations to provide care to low-income, underserved communities.

HEALTH DISTRICTS OF THE FUTURE

PERKINS AND WILL, 2014

Conclusion

As healthcare values shift toward patient focused design, community involvement will play a major factor in how the programming and values of the facility reflect the needs of the community. Social determinants are the driving force towards health equity and how healthcare systems can provide opportunities for residents to live healthy lives.

Health Districts are the beginning to integrate the community with healthcare design. While programs may be implemented within the healthcare system itself, many solutions to urban planning provide opportunities to healthy living outside of the hospital. By including local aspects of population needs, place and location, and partnerships, we may influence the design of individual facilities, rather than a one size fits all approach. Every community is different with their own values and ideals. A medical facility alone may provide economical job development and local business but combining it with the community allows it to grow and prosper with better health outcomes.

Thesis Considerations

Taking these conclusions about health districts into account, the project will require careful consideration to the site and community context. Because the project will be evaluating the determinants of health that are present in a local setting, the four "Ps" of planning when determining the program and integration with the community. The population factor will be the community of Rainier Beach, by finding the needs of the community and how design can improve the resident's health and wellbeing. The place or site has been determined, and features a nearby public green space, bike path, and light rail station that to support accessibility and integration. Near the site, lies Oromo Cultural Center. This facility supports the community's diversity and ethnic background by education and spiritual programs. By partnering a healthcare facility, community center, and cultural center into the same block, this could become a health district that the public can use for social events, continuing education, spirituality, physical activity, and connectivity. When the determinants of health and community attributes are considered while designing the facility, the community is able to perform to its best possible outcome for health and wellbeing.

"Now we realize that how we design the built environement may hold remendous potential for addressing and - it is to be hoped - PREVENTING - many if the nation's current public health concerns."

BASIC BUILDING TYPES FOR

Healthcare Design

Traditionally, healthcare design is focused on the clinical process, including mapping patient and staff flow.

The “backstage” design on healthcare facilities includes mapping material flow and management of food services, security, and wayfinding for operations and patients.

Ancillary Care

The ancillary department is responsible for the major support for services in a healthcare facility. These support services can be broken into three categories: public and administration department, diagnostic, intervention, and therapeutic department, and logistical support department. Some of the services included are patient healing intervention, ambulatory support activities, treatment and diagnostic labs, and data distribution.

Administrative Department

This department is primarily where the community and healthcare facility integrate for patient health. Serving as the main entrance to the facility, public activities are located adjacent to the space, such as gift and flower shops, volunteer and social services, food service, and counseling and serve as a point of orientation for the rest of the facility.

After moving from the public spaces, to administration, the patient will be admitted or discharged from the facility. While it is located near public spaces, adjustments should be made to protect the patient’s privacy when discussing medical history and personal information. Financial and business services are also located nearby for the patient to consult on payment methods and insurance options.

The next area within the layout are medical records and data processing and information systems. This is the central support for patient records, diagnosis, treatment protocols, and support for physician transcription. This area should be accessible to all staff members that need access to data for a patient’s health.

HEALTHCARE FACILITIES

Kobus, 2008

Diagnostic, Interventional, and Therapeutic Department:

This department addresses quality patient care and the support hub of inpatient and outpatient functions. They are typically grouped together for integrated support, as well as eliminating doubled up services. As one of the most commonly used areas, the design must be walkable for patients and staff with aligned functions to support workflow patterns.

Many of these areas may also support the operational and mechanical needs of the facility. Some of the services include the "backstage" support needs, such as special plumbing for medical gasses, special water, and waste disposal, electrical work for equipment grounding and emergency power, and HVAC design for air purity and control.

Logistical Support Services:

Located away from the direct nursing and clinical areas, the logistical support department is necessary for supply and equipment services. These are often located near vertical methods of transportation, as well as receiving and loading docks, for easy service distribution.

Planning and Design:

In an ideal design, spaces within similar department types would be grouped together. These spaces my change depending on patient and staff flow, but often require support spaces in addition to the typical treatment areas. By sizing and placing spaces adjacent to each other, we are able to minimize duplication of spaces, distance for equipment and workflow traffic, and reduce cost of space.

Once space needs are established, the design process moves towards designating migrating patterns. These movements of circulation include separation of public traffic, staff flow, and equipment distribution. By making these spaces more modular and flexible, we are able to change the design, traffic flow, and space requirements to adapt to new technological advancements and care requirements.

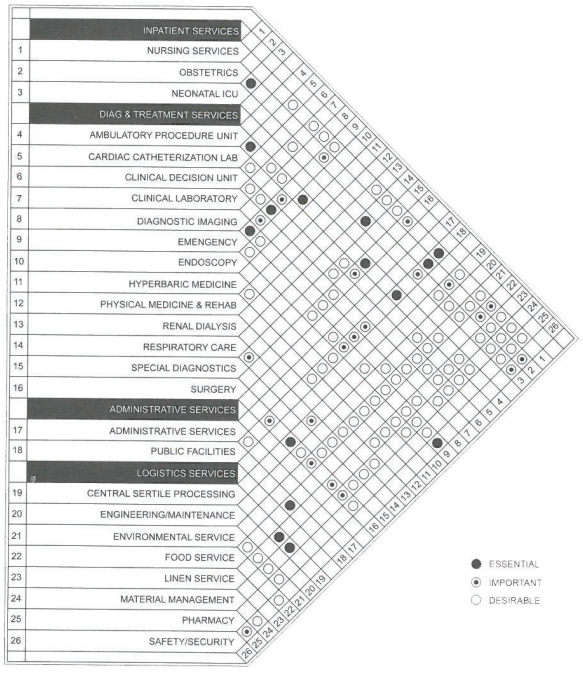


FIGURE 13 - ANCILLARY CARE MATRIX

BASIC BUILDING TYPES FOR

Clinical Decision Units

While this thesis project will be designed around an outpatient, community clinic, the unit interrelationship diagrams between a clinic design and clinical decision unit may produce a similar outcome. A clinical decision unit is a popular department within hospitals to improve movement of patients from diagnosis, to treatment, nursing care, and discharge. Although this department specializes in diagnosis and decisions of moving to inpatient or outpatient care, outpatient clinics follow a similar central care station design, with an addition of patient rooms, support space, and waiting area.

Clinical decision units are separated into activity areas by category needs, observation, or therapeutic procedure. The patients are first directed towards diagnostic units for procedures, while medication and equipment are brought to them. While clinical decision unit patients often arrive unscheduled, patients brought to an outpatient clinic may be scheduled or unscheduled.

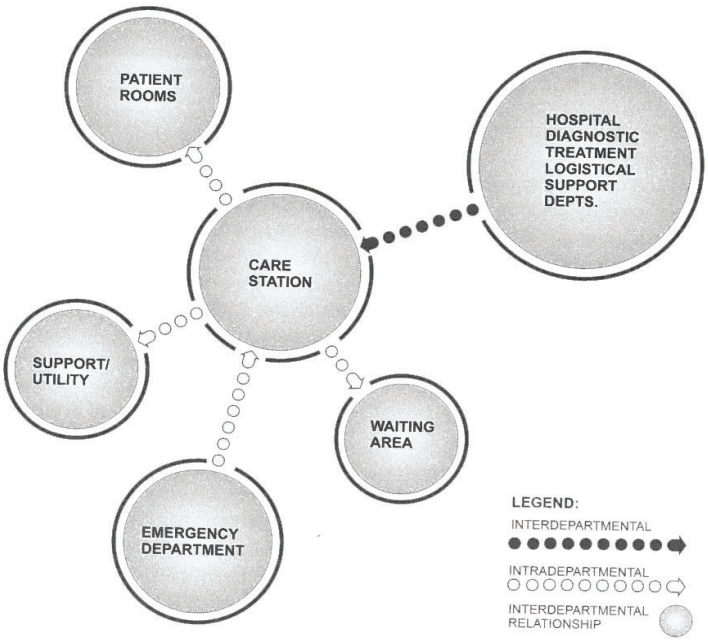


FIGURE 14 - CLINICAL DECISION UNIT DIAGRAM

HEALTHCARE FACILITIES

Kobus, 2008

Thesis Considerations

While this book addresses building considerations on a larger, hospital and laboratory setting, it also introduces the "backstage" settings of a hospital that may be overlooked or put to the side when designing the layout. Many of the factors that go into these settings such as programmatic, logistical support, and patient wayfinding can also be implemented into a smaller clinical facility that has been proposed for this thesis project.

While the interrelationship diagram addresses patient rooms and emergency department spaces that may not be programed into this thesis project, it does show correlation of how movement of patients from waiting room to treatment may progress. The care station is the supporting factor for all other departments as it is where the care decisions and integrative services take place.

The interrelationship matrix that has been provided shows the required spaces and where they should be placed nearest to when creating an efficient layout. The areas that will be most similar to a community clinic design would be the administrative department and logistic services. These areas are common for public use and will serve as a connection point for the community center addition. By using this area as an integrative buffer between the two typologies, it allows the user to receive many different types of health influences, such as physical health and social wellbeing. The primary function of these spaces will come from the determinants of health such as, a food shelter due to its location in a food desert, a space for continuing education for the lower graduating rates, and multipurpose room for community organization meetings.

SPACE PLANNING GUIDE FOR COMMUNITY

Introduction

Reported by Ontario's Local Health Integration Network, the Ministry of Health and Long-Term Care has provided a base of planning design for administrators, architects, programmers, and engineers involved in the process of healthcare design. The term "OASIS" refers to operational efficiency, accessibility, safety and security, infection prevention and control, and sustainability. These terms have become guidelines to inform planners on creating spaces that provide a healthy environment for patients.

The core program of a healthcare facility are the healthcare services provided to the community. These services may range from an annual check-up, to chronic disease management, mental health assessment, counseling, and treatment procedures. An integrated approach is becoming more common in healthcare, where a patient may have overlapping symptoms that require help from multiple departments. Providing shared workspaces for professionals to work together contributes to better health and wellbeing for the patient.

Types of Spaces

Because integrated methods of delivering healthcare are becoming more common, some spaces can be combined or eliminated to refrain from duplicated rooms or workspaces. There are two main types of zones in a healthcare facility. These are clinical space and facility support space. The spaces should be organized in a way where the plan is most effective, eliminates waste, and facilitates sharing across programs. For example, an exam room would be used around 80% of the time, and should be flexible for different uses, while the waiting room size may depend on the number of exam rooms and timeliness of schedule.

Clinical spaces are required for primary healthcare facilities for patients to receive the care they need. Staff may perform exams, diagnosis, and treatment throughout the clinical area, and requires sanitary measures to be taken for the safety of the staff and patient's health. Waiting areas, exam rooms, counselling rooms, specialized care rooms, labs, medical staff offices, and utility support rooms are types of spaces that would be found in the clinical zone.

Facility support spaces are the second zone of the healthcare model. These are non-clinical spaces for building function and community activities. Administration, cultural spaces, and support rooms are all activities that occur in this zone. Many of these often overlap and are shared between departments, such as administration, retail areas, and community space. All of these are often found near the main entrance to the facility and are considered public spaces.

HEALTHCARE FACILITIES

(Ministry of Health and Long-Term Care, 2014)

Room List Example

Reception Area:

- Reception Desk with Interview Area
- Waiting Room (incl. child area)
- Scooter / Stroller Parking
- Public Washrooms
- Medical Records Room

Administration:

- Admin Offices
- Workstations / Shared Areas

Building Support Rooms:

- IT Server / Telephone Rooms
- Housekeeping Room
- Electrical Rooms
- Mechanical Rooms
- Garabage / Waste Holding Room
- Storage

Clinical Area:

- Examination Rooms
- Interview / Counceling Room
- Meditation Area
- Clean Utility Room
- Soiled Utility Room
- Patient Washroom (single, barrier free)
- Practitioner Work Spaces
- Swing Offics (with Team Model)

Shared Meeting/ Multipurpose Space:

- Meeting Rooms (number and size based on activity)
- Storage for meeting room supplies and furniture
- Refreshment Station
- Demonstration Kitchen
- Cultural Spaces (specific to functional program)

SPACE PLANNING GUIDE FOR COMMUNITY HEALTHCARE FACILITIES

(Ministry of Health and Long-Term Care, 2014)

Future Growth and Flexibility

Because the healthcare model changes often due to technology changes and the needs of patients, it is recommended that spaces are accommodated for future growth to the facility. These areas of growth are most common in the clinical zone for primary care, storage and equipment changes, or needs of the community, rather than administration or group space. By creating a space needs table, the programmers and architects are able to see the amount of space needed compared to the function, number of rooms, and create a variance for future development.

The term "soft space planning" is used to describe spaces that can be moved or reprogrammed for little change in expense, functionality, or timeliness. These spaces are usually storage, office spaces or interview rooms that can be moved to another area, freeing up space where it is most important, such as exam rooms or medical usage. If the soft space is intended to be used for future clinical functions, designers should take mechanical ventilation into consideration beforehand for minimal changes in the future.

Thesis Considerations

Developing a room list with space requirements when developing the program for the thesis project, I will be able to separate spaces by department to find the best layout for the design. Planning the spacing requirements before hand can lead to integration of spaces and eliminating waste. This table also shows which spaces require the most patient considerations and what can be sacrificed or moved for future healthcare models as they change for technology and needs of the community.

The term "OASIS" refers to operational efficiency, accessibility, safety and security, infection prevention and control, and sustainability. These attributes are important to the facility because as they are both ethically linked to architecture as we strive to promote safety and wellbeing, as well as healthcare's motto to "do no harm". As the design for the thesis project continues, I will be considering the operational efficiency and how this can produce a better layout that is more walkable to staff and patients, as well as mechanically to lower operational costs. The site in accessible in multiple situations, due to links by major roads, proximity to the city's light rail system, and entrance to the community. Safety and Security, as well as prevention and control, are programs that will be linked to the support spaces in the facility. These spaces must be positioned in accordance to the function they serve to provide support to both the staff and the patient. Finally, sustainability may reflect the building's programs to create better operational outcomes, as well as its ability to adapt and repurpose spaces as healthcare models change. Not every space of the facility will always be in use, but being adaptable to fit the needs of the community is the goal to creating spaces that promote health and wellbeing.

TYPOLOGICAL RESEARCH

Precedent Studies

The following case studies were done in hope for an understanding of healthcare design layouts, community integration with healthcare facilities, and sustainable approaches to design. The first is the most helpful to the typology, as it is a community clinic with a similiar end goal and focus. The following case studies each have an attribute that can be taken into accound when designing the final program, however, these buildings are typically hopsital settings and will be larger that the final thesis design.

Meridian Center for Health

Architect: NBBJ (2015)
City: Seattle, Washington
Typology: Medical Clinic, Dental Clinic, Behavioral Health, Community Center
Square Feet: 44,745 sq ft built, 60,273 sq ft lot size

Martin Luther King Jr. Community Hospital

Architect: RBB Architects (2013)
City: Los Angeles, California
Typology: Community Hospital
Square Feet: 304,000sqft

Eastside Health and Recovery Center

Architect: Ankrom Moisan Architecture (2019)
City: Portland, Oregon
Typology: Clinic and Transitional Housing
Square Feet: 199,000 sf (30,000 Site)

Virginia Mason Medical Center

City: Seattle, Washington
Typology: Hospital, Efficient Healthcare Model

MERIDIAN CENTER FOR HEALTH

Medical Clinic + Community Center:

Architect: NBBJ (2015)
City: Seattle, Washington
Typology:
- Medical Clinic, Dental Clinic, Behavioral Health
- Center for Women & Infants, Children, Maternal Support
- Human Services

Square Feet:
- 44,745 sq ft built
- 60,273 sq ft lot size

FIGURE 15 - MERIDIAN CENTER FOR HEALTH

MERIDIAN CENTER FOR HEALTH

Summary:

Meridian Center for Health is a community facility in Seattle, Washington, that unifies healthcare and human services into one location. Their goal is to bring comprehensive care to an under-served population and treat the "whole person", especially those with little to no insurance.

Meridian Center focuses on treating physical, behavioral, and public health related services. The medical center includes a clinic, dental facility, behavioral and mental health, as well as a section for women and child care. The community focused area offers classes, recovery meetings, organizations, and human services. All these services are available under one roof to provide integrative care in one location that promoted health and wellbeing in an under-served community.

"The Meridian Center is more than a place to go when one is ill—but also a place to go when one is well. To create an environment of health and wellbeing, the project addresses not just clinical needs in isolation, but also the social determinants of wellness, while embracing the rejuvenating aspects of nature through a restored site." -NBBJ ((NBBJ, 2015)

Program:

Physical Health:

- Medical Clinic
- Dental Clinic
- Behavioral Health
- Mental Health
- Women / Child Care
- Recovery Programs
- "Integration Zone"

Community Services:

- Housing Placement
- Job Training
- Resume Writing
- Conference Room
- Recovery / Substance Meetings
- Cooking Classes
- Community Organizations
- Farmer's Market

Natural Components:

- Public Park
- Trees
- Pond
- Art Walk
- Habitat for Native Species

COMMUNITY IMPACT

Breakthrough:

Meridian Center for Health is a community focused facility that addresses the determinants of health disparities to find the best healthcare design and how it is practiced for the needs of the population. They meet patients where the need is greatest, and unify different organizations to bridge gaps in wellness by providing services necessary to support a fulfilling life.

Value:

The Center was designed as “a place to go when one is ill, as well as when one is well” (NBBJ, 2015.) The social determinants of wellness, such as education, physical activity, access to healthcare and healthy foods, and family and community support were taken into account when programing the spaces for the design. All health services, such as clinical, dental, behavioral, and human can be found in one place, imitating a “one stop shop” to create an environment of health and wellbeing.

Health determinants are important to the design because they reflect the needs of the community. While some neighborhoods prosper, others such as this have found themselves in a health disparity, meaning they do not have the same opportunities or resources for wellness. Meridian Health battles these disparities and to promote healthier outcomes. By doing this, they are enabling the prevention of further harm throughout the population.

FIGURE 16 - MERIDIAN CENTER INTEGRATION ZONE

POPULATION SERVED

Demographics:

When Meridian Center for Health was built, the neighborhood was in desperate need of a healthcare facility. The Center is located where the greatest number of low income population are under-served by a health center in North Seattle. 68,000 people were labeled as low income, while 200% were at or below poverty level. 48,220 of that population were not served by a public health center (Washington State Healthcare Authority, 2016).

The Center treats homeless and provides affordable healthcare to low income individuals. Because of income, healthcare access, homelessness, race, and ethnicity, North Seattle had been experiencing a large increase in health disparities. The census data of 2000 reported 20% of the North Seattle population was non-white and while 34% of the population living in poverty was also non-white (Washington State Healthcare Authority, 2016). The need for healthcare access was shown through North Seattle demographics and continues to be a problem in neighborhoods with similar situations.

Services:

When the previous facility was located on the site, it provided care to 7,000 individuals. Today, 14,000 patients have taken advantage of the health center. The facility contains a 12 operatory dental service, 340B pharmacy, and medical clinic. While these serve the primary care needs of the population, community programs are also included.

Public health needs are met through a WIC nutrition program and maternity support. The community center within the facility gives opportunities for healthy foods, exercise programs, legal services, second language class, and senior and parenting classes. Behavioral health, specialty care, and chemical dependency are located adjacent to the clinical department to provide an integrative experience.

Source: (Washington State Healthcare Authority, 2016)

A SITE FOR HEALING

Exterior Components:

The location of the site was previously a health clinic built in 1980 (NBBJ, 2015). It was repurposed to make it more accessible and provide more open space. While the interior supports the medical needs of the community, the exterior has become an extension of that concept to create a healing environment.

The architects focused on three main components while planning the site. First, the facades were created from weathering steel. They were inspired by the local iron oxide-rich Lichton Springs. The Duwamish Tribes believed that the springs contained healing powers, and were included to bring that concept to the healing spaces (AIA Seattle, 2017). They also used wood, warm colors, and operable windows to reduce stress and increase trust with the care team.

The covered patios ave become multipurpose spaces. They provide a sense of warmth, comfort, and shelter while designating a space for patients, homeless, and relaxation when people are uncomfortable indoors. Healthcare providers may consult patients in this zones as an alternative to exam rooms.

Landscape designers and architects collaborated on the design for the site. This included preserving the existing site and enlarging the park to include an art walk and neighborhood green space. Native plants surround the retention pond to give it a relaxing, aesthetic appeal.

FIGURE 17 - MERIDIAN CENTER BIOSWALE

ENVIRONMENTAL DESIGN

Landscape:

While consulting with a landscape architecture firm, NBBJ included bioretention cells on the south facade direct storm runoff to the retention pond that supports 100% of the stormwater drainage on site (AIA Seattle, 2017). This area houses many of the local plants and wildlife, as well as the entrance to the art walk by continuous foot bridges.

LEED Qualifications:

- 25kW solar roof that can expand to 75kWh (16% total electrical power)
- 57% reduction of irrigation water by native landscape
- 40% reduction of energy usage
- 100% storm-water retention pond
- 96% construction waste recycled

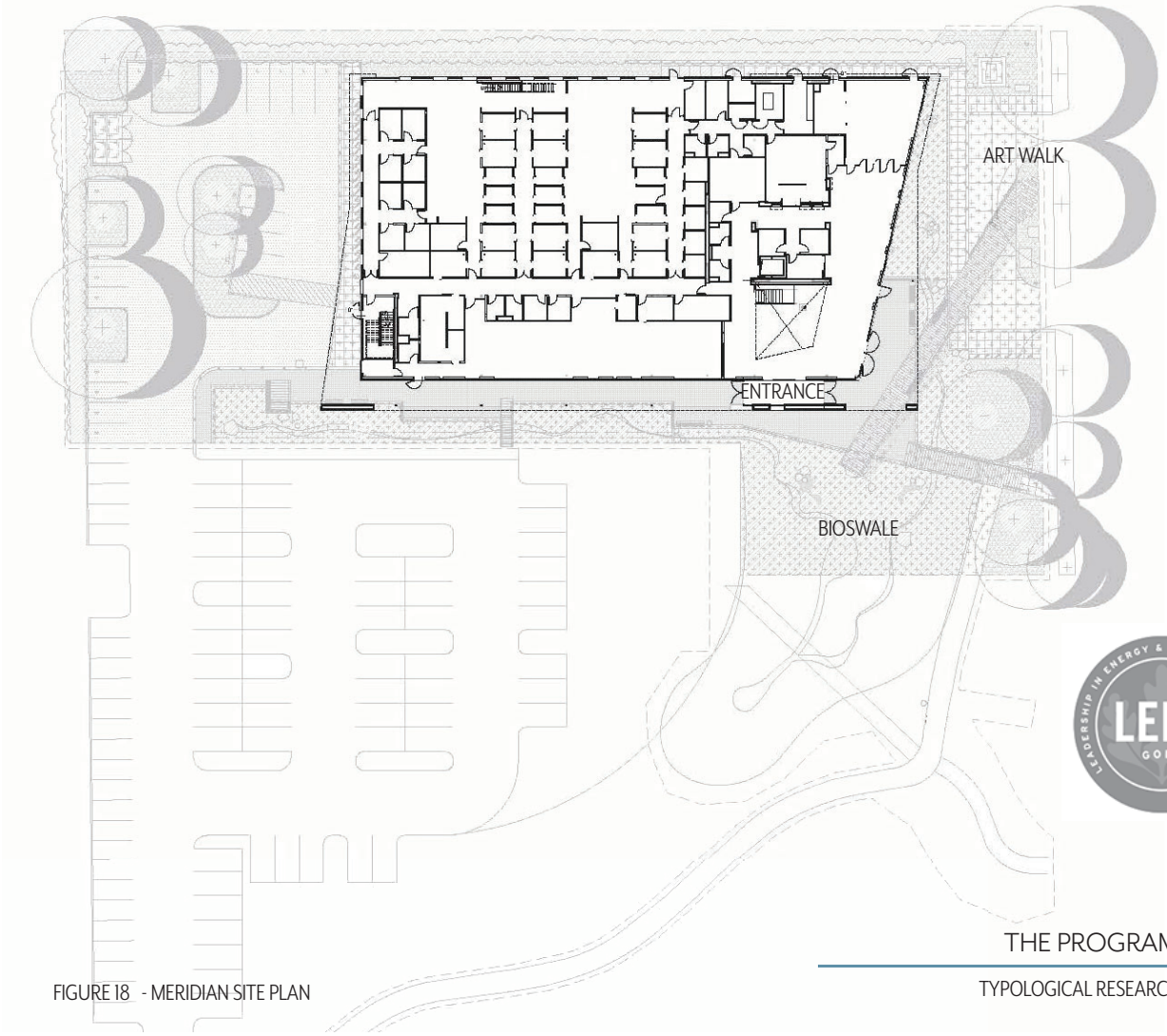


FIGURE 18 - MERIDIAN SITE PLAN

GOALS FOR THE PROJECT

Transformation Goals + Project Intervention:

- Reduce avoidable use of intensive services.
- Improve population health with a focus on prevention.
- Accelerate transition to value-based payment.
- Ensure Medicaid per-capita growth in below national trends.
- Health systems capacity building.
- Redesign care delivery.
- Improve population health and create prevention activities.

Approach + Aim:

"No Wrong Door":

- No one is turned away for inability to pay.

Quality + Innovation:

- New opportunities to expand services and address unmet needs.
- Reach the national model for healthcare integration.
- "Triple Aims" - Improve patient experience, health of population, and reduce cost per capita of healthcare

Client Centered:

- Services and staff respond directly to the needs of the patient.
- Respect race, ethnicity, socioeconomic standing, gender, and cultural diversity.

Partnership:

- Provide joint service of delivery planning - "one stop shop"
- Remove barriers of integrative services and financial resources.
- Respond to unmet needs and support health and wellness in all stages of life.

Source: (Washington State Healthcare Authority, 2016)

INTEGRATIVE CARE

All One Team:

The design for Meridian Center for Health stems from its integration of multiple services into one facility. The layout for the design focuses on different typologies blending together to attend to the clients needs, rather than just being co-located. Many of these spaces are flexible by sliding or rotating doors to create individual or larger spaces.

Doctors and nurses often share facilities such as exam rooms, laboratory space, lounges, and support spaces. This way they are able to consult with one another on results and provide the best patient centered care possible. Clients often have more than one need

The welcome center is located in the lobby as an information desk and guidance toward your destination. They are centrally located to provide anything you need, and near the vertical connection for the upper floors. Patients can check in for all services at once rather than at separate desks.

How it's Integrated:

Design Layout:

- Team spaces "hot desking" allow health providers to consult one another.
- On Stage - Off Stage Design: Provides engagement and privacy between patient and caregiver.
- Clinical connections to human based and community needs.
- Acknowledgment of health determinants and disparities.
- Integration manager - Responsible for all integrative services and client centered care.

Community Integration:

- Public Spaces support healthy eating, living, social support, and education that is available after hours.
- Accessible through public transportation services.
- 65 languages are spoken, written, or produced through way finding.

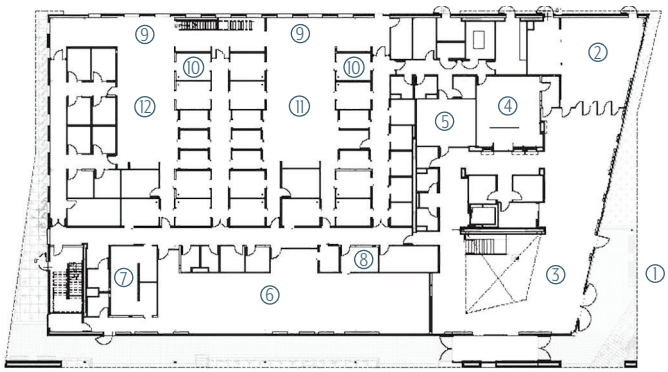
RESULTS: INTEGRATED COST DECREASE

- Decrease in duplication of services and missed hand-offs between population and agencies.
- Increase in primary care and preventative care.
- Decrease of unnecessary emergency room cost (lower cost per person for the community)
- Facility management savings - funding preserved for direct care.

Source: (Washington State Healthcare Authority, 2016)

PROGRAMMATIC SPACES - FIRST FLOOR

First Floor:



① Drop-Off Zone
② Community Room
③ Lobby
④ Pharmacy
⑤ Human Services
⑥ Waiting Room
⑦ Lab
⑧ Support Space
⑨ Integration Zone
⑩ Exam / Consult Room
⑪ Central Clinic
⑫ Behavioral / Recovery Services

Program:

Clinical Care
Recovery Zone
Integration Zone
Human Services (Community)
Public Space
Support Space

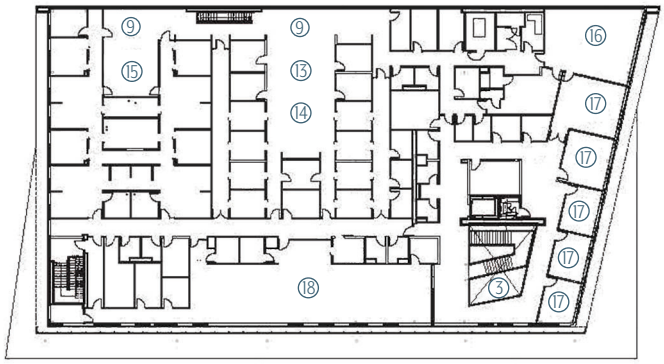
Program Circulation:

Clinical Care
Recovery Zone
Integration Zone
Human Services (Community)

PROGRAMMATIC SPACES - SECOND FLOOR

Second Floor:

Women / Infant / Child Services ⑬
Maternity Support ⑭
Lobby ⑮
Staff Lounge ⑯
Group Wellness ⑰
Waiting Room ⑱

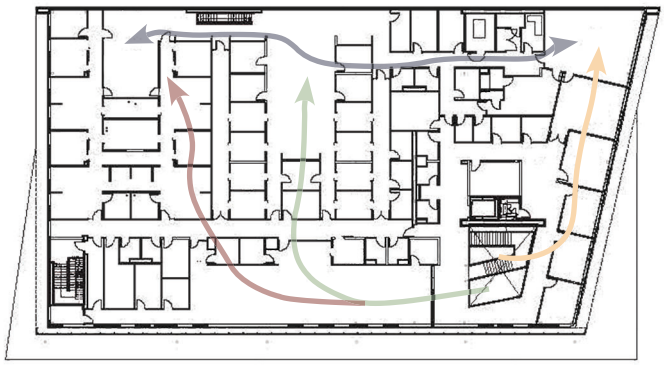


Program:

Clinical Care (Women / Child Services)
Dental Clinic
Integration Zone
Human Services (Community)
Public Space
Support Space

Program Circulation:

Clinical Care
Dental Clinic
Integration Zone
Human Services (Community)

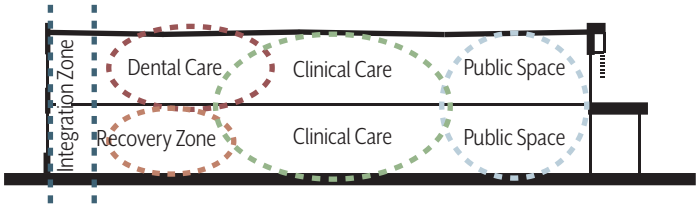


PROGRAM ANALYSIS

Integration Zones:

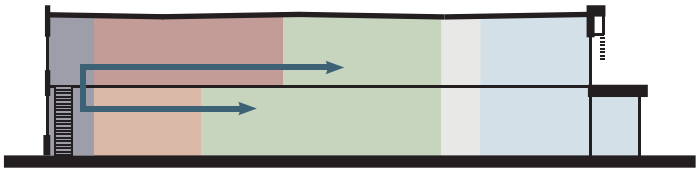
- Mixed Integration
- Clinical Integration
- Public Integration
- Behavioral Integration
- Community Integration

Integration Zones



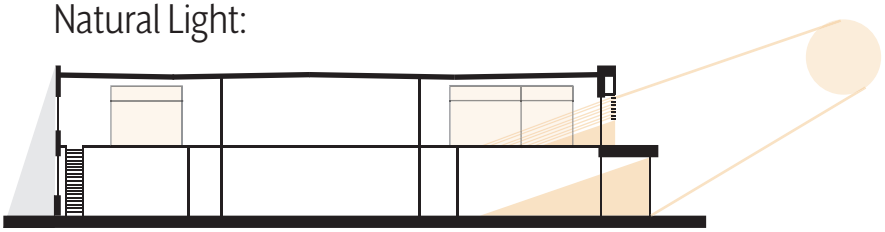
- Mixed Integration
- Clinical Integration
- Public Integration
- Behavioral Integration
- Dental Integration

Program Circulation:



- Clinical Care
- Recovery Zone
- Integration Zone
- Dental Care
- Public Space
- Support Space

Natural Light:

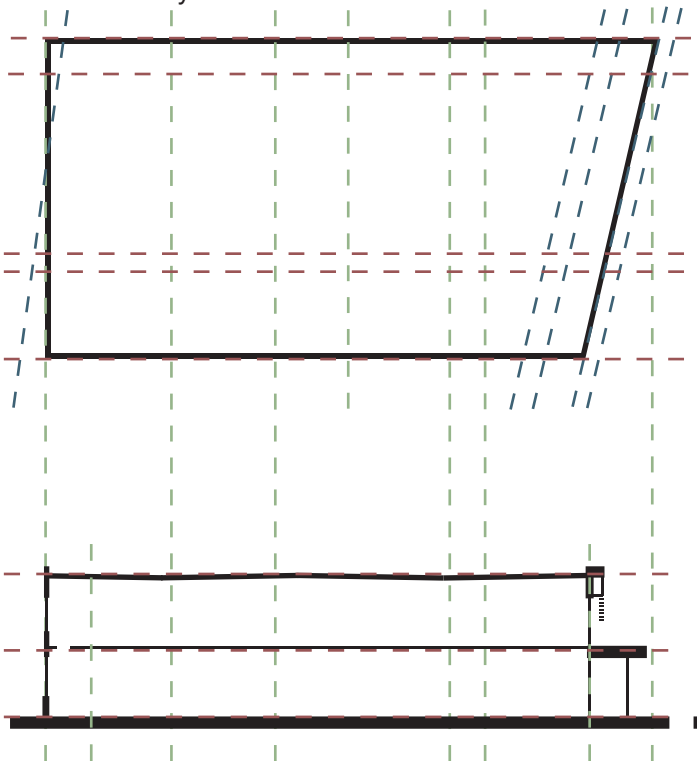


PROGRAM ANALYSIS

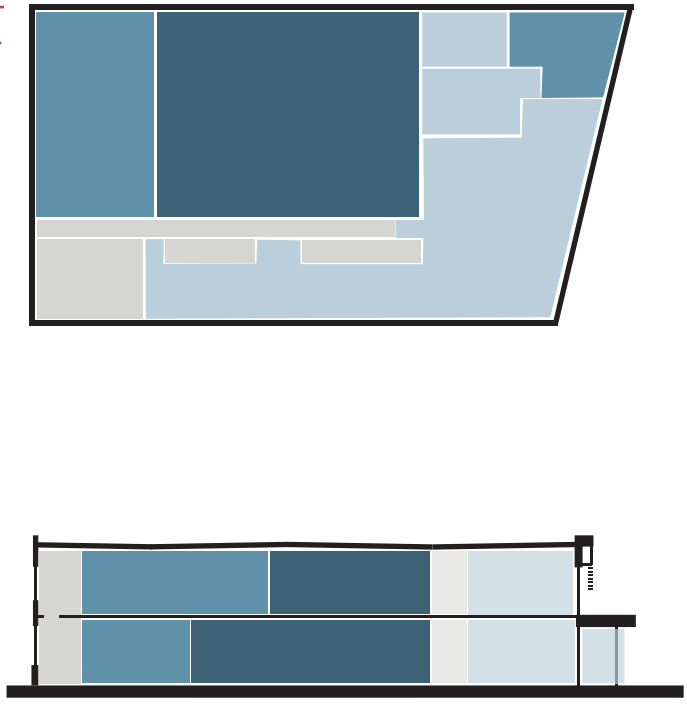
Integration Zone:

Mixed Integration
Clinical Integration
Public Integration
Dental Integration
Community Integration

Geometry:



Heirarchy:



MARTIN LUTHER KING JR COMMUNITY HOSPITAL

Community Medical Campus:

Architect: RBB Architects
Design / Planning: HMC Architects
City: Los Angeles, California
Typology: Community Hospital
Square Feet: 304,000sqft
Cost: $148 Million
Year: 2013

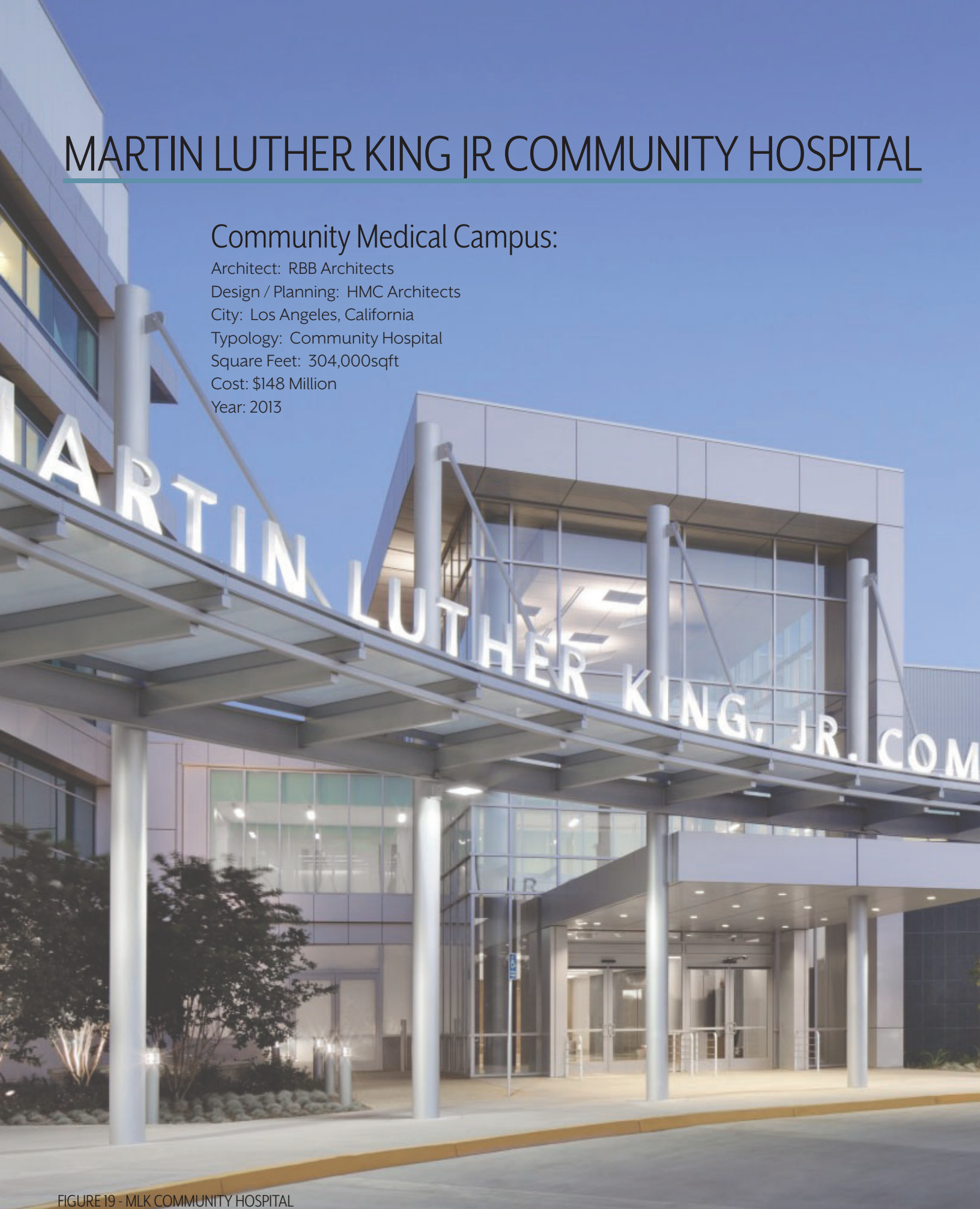


FIGURE 19 - MLK COMMUNITY HOSPITAL

MARTIN LUTHER KING JR COMMUNITY HOSPITAL

Summary:

Martin Luther King Jr. Community Hospital strives to provide care to local, low income patients. Once shut down in 2007, the hospital was reborn to help the community rediscover its cultural and historical significance. Although the former hospital was unsuccessful, it was the only source of healthcare to many in the poverty-stricken area of the city. Located in Willowbrook, near Compton and Watts, this neighborhood was known for a history of violence and riots. A solution had to be found that would service the city's most vulnerable area with accessible care.

The new healthcare facility was built in hope of change. From the hospital stems a network of additional services, including senior housing, healthy food options, and jobs for the area to support the community.

Keeping in mind how intimidating hospitals may seem, MLK Community Hospital aims to produce a warm, welcoming design using natural light and gardens. The main goal is to provide quality care to its clients, which requires a relaxing and efficient environment.

"We wanted to create a timeless, peaceful environment that would reduce stress. The floors of public areas are terrazzo, which is durable and reflects light. Acoustic plaster absorbs sound. The palette is restrained, and lighting is unobtrusive. A chapel, lined with marble and granite and lit from narrow stained-glass windows, provides a quiet retreat for meditation." -Pam Maynard, HMC Lead Designer (Webb, 2014)

POPULATION SERVED

An Underserved Community:

The new design can serve a 3-mile radius of 1.35 million residents. The adjacent neighborhoods include a low-income population, such as Compton, Watts, Lynwood, and Inglewood. While the hospital is still trying to hire more doctors, it previously had a shortage of 1,200 doctors and specialty physicians.

With a highly diverse population, 1/3 of the residents are at or below poverty level and less than half adults speak English as their primary language. This implies the need for translation materials within the healthcare system.

Before the hospital was reopened, it was located in a health disparity. It lacked access to healthy foods, safety, walkable pathways, and healthcare access. Only 60% of the area has a high school diploma and have a 30% higher chance of heart or coronary disease. MLK has made efforts in acknowledging these inequities and plan to make community and education part of its goals in its new philosophy (Colliver, 2017).

"There are tremendous challenges here that you just don't have in West L.A.," referring to the wealthier side of the county. "Everything in life is uncertain: jobs, housing, food, safety, health care, transportation, child care. Everything is a challenge, so when you have a medical issue, whether truly severe or not, there is a tendency to perceive it as supersevere, when maybe it's not."
- Alan Kaplan, MD (Colliver, 2017)

FIGURE 20 - MLK RENVOTED FACILITY

HISTORY

King / Drew Medical Center:

When it's doors first opened in 1972, the hospital was the only source of healthcare for the South East general area. The 1965 Watts Riots stemmed the need for a local facility, after killing 34 people and leaving 1000 injured in a location with no hospital. The hospital served the needs of it's people and it's poorest residents, but was low quality and caused many additional problems. In 2007, "Killer King" hospital closed due to allegations of incompetence, medical errors and needless deaths. This pushed residents to find care elsewhere, or disreguard care entirely (Jennings, 2015).

The previous facility did provide a variety of programs before it closed. It had 450 beds on a 40-acre campus. While the outpatient center did remain open and was remodeled in the new design, the active trauma center is not part of the new facility.

MLK Community Hospital:

The new facility opened its doors in 2015 to provide local, low cost healthcare. It is a private partnership, non-profit organization that allows it to be a stand-alone hospital. The supporters of the hospital wanted an attractive, state of the art facility that provided the best technology despite its location (HIMSS Analytics, 2016).

The new facility is built from the structural frame of the medical office building's first and second floors, while the rest had to be demolished to meet the seismic codes and conditions. It was reskinned in aluminum with blue and green glass facades, while a steel canopy links the new outpatient department to the ancillary building.

GOALS FOR THE PROJECT

Community Care:

Providing better preventitive and primary care to low-income patients is the main goal of MLK Community Hospital. They go beyond the walls of the facility to address the social determinants of care and provide services to better the community.

Culture of Quality:

The quality goals within the hospital focus on culture, techincal, interpersonal, and efficiency. These procedures will guide the work by employees to take quality focused actions for patient centered care (Hochman, et al., 2016).

1) Establish a history of processes and procedures for measurable, high-quality improvement efforts.
2) Innovate leadership and external pressures that drive quality improvements.
3) Provide care to a high volume of Medicaid and uninsured patients.

Technological Focus:

MLK Community Hospital has been named a Stage 6 rating for implementation and utilization of health information technology applications. Only 26% of hospitals have reached this goal (HIMSS Analytics, 2016). They realized that technology is the best way to communicate information to surrounding health disparities, and have implemented state of the art systems to provide the best care possible.

FIGURE 21 - MLKCH LOBBY

COMMUNITY PROGRAMS

Path to Community Health:

MLK Community Hopsital realizes that they are located in a community that has many chronic health needs, a diverse population, and the poorest health status indicators in Los Angeles. Despite their closing in 2007, they have reopened with a new mission: provide quality preventitive and primary care, be innovative and collaborative in community care, and create a community rooted in health and wellness.

What makes the hospital unique, is the community support it has recieved after being opened once again. The old hospital was a source of pride for the African American community, but hope that the new hospital will be the same.

"When a hospital goes down, it shows that nobody cared about it, but there was a circle of people who fought to save it and resurrect it from the ground."
-Gloria Jernigan, Watts Resident (Jennings, 2015).

The hope for the new hospital is to integrate the campus with the community. Because of the lack of food access, income, safety, education, and walkability these will be guidelines for future services.

Community Services:

- Laywer and Tenant Resolution
- Mold Abatement
- Finding Homeless Permanent Housing
- Health Education
- Transporation Services
- Art Installations

Future Services:

- Skilled Nuring
- Senior Living
- Retail
- Education
- Community Center

PROGRAM + DESIGN

Building Program:

Urgent Care:

- 21 High-acuity treatment bays
- 20 ICU beds
- 8 Fast-track rooms
- 4 Operating Rooms
- Triage Station
- Waiting Room
- 18 Labor / Delivery / Post Partum Beds

Outpatient Care:

- Immunizations
- Prenatal Care
- Women's Health (OB/GYN)
- Disease Diagnosis and Ongoing Treatment
- Treatment for Chronic Illnesses
- Prescription Refills

Specialty Care:

- Cardiology
- Dental
- Dermatology
- Gastroenterology
- Hematology / Oncology
- Neurology
- Obstetrics / Gynecology
- Ophthalmology
- Oral Maxillofacial
- Otolaryngology
- HIV/AIDS

Support Spaces:

- Gift Shop
- Lobby
- Information Desk / Reception
- Security Check
- Chapel
- Cafeteria
- Interpreter Services
- Meditation Room
- Healing Garden
- Local Art

Other Services:

- Mental Health Center
- Central Plant (Mechanical)
- Plant Management (Mechanical)
- Parking Structure
- Office and Administration

Totals:

- 256,350 square feet
- 5 Floors
- 131 beds

COST + EFFICIENCY

Decreasing Cost:

There are many different techniques that can go into cutting costs within a hospital, such as efficiency modeling and operational costs. When each of these models are focused into one design, we can decrease building cost, production cost, and patient cost.

Efficiency Modeling:

The efficiency of the design depends on its layout. The biggest focus on MLK's efficiency relied on eliminating duplicated service areas. By creating one central, sterile department, they were able to bridge the hospital and outpatient clinic together. Because the California Office of Statewide Health Planning and Development demands that the department be in hospital structure, each morning case carts are delivered for the day's surgeries to each sterile surgery suite. Kirk Rose, principal and healthcare practice leader at HMC Architects, stated that the strategy saved millions of dollars in construction costs and duplicated equipment in the outpatient facility (DiNardo, 2016).

The main layout also helps divide the waiting rooms from fast-track emergency services. The new lobby has triage near the entrance to access the patient's needs by urgency and then are directed to the waiting room or emergency services. By circulating different pathways, patients can be led from triage to 8 fast-track rooms or 21 high-acuity treatment bays (DiNardo, 2016).

Reusing the existing structure of the first two floors as well as the site's 12 bay loading dock saved money in construction costs. Because there are other accessible trauma care units, the hospital was able to eliminate this addition to the design and were able to focus on other services including: imaging, emergency services, birthing units, and general surgery.

Operational Costs:

A variety of mechanical services were added to the design to lower operational costs within the facility. High-efficiency, local heating and cooling fans in each room lower the duct size, while low-flow plumbing lowers the plumbing issues. Thermal glazing, natural lighting, and renewable materials were also used as a sustainable approach (Webb, 2014).

FUTURE COMMUNITY INTEGRATION

20 Year Plan:

MLK Community Hospital has a mission to foster community connections and identity through a social, economic, and environmental impacts (WLA, 2015). Goals for the master plan include innovation to the site design and programs. To complete the design, it will need to be flexible for future programs and long-term needs, as well as a connection between the campus and community by a transit system.

The master plan will address the health disparities present within the community. Additions of mixed use will be created for wellness, education, research, public safety, social support, access and mobility, land use, and environmental quality (WLA, 2015). These will lead the community to a brighter and economical future by bringing in new buisness and providing opportunities that are not currently available.

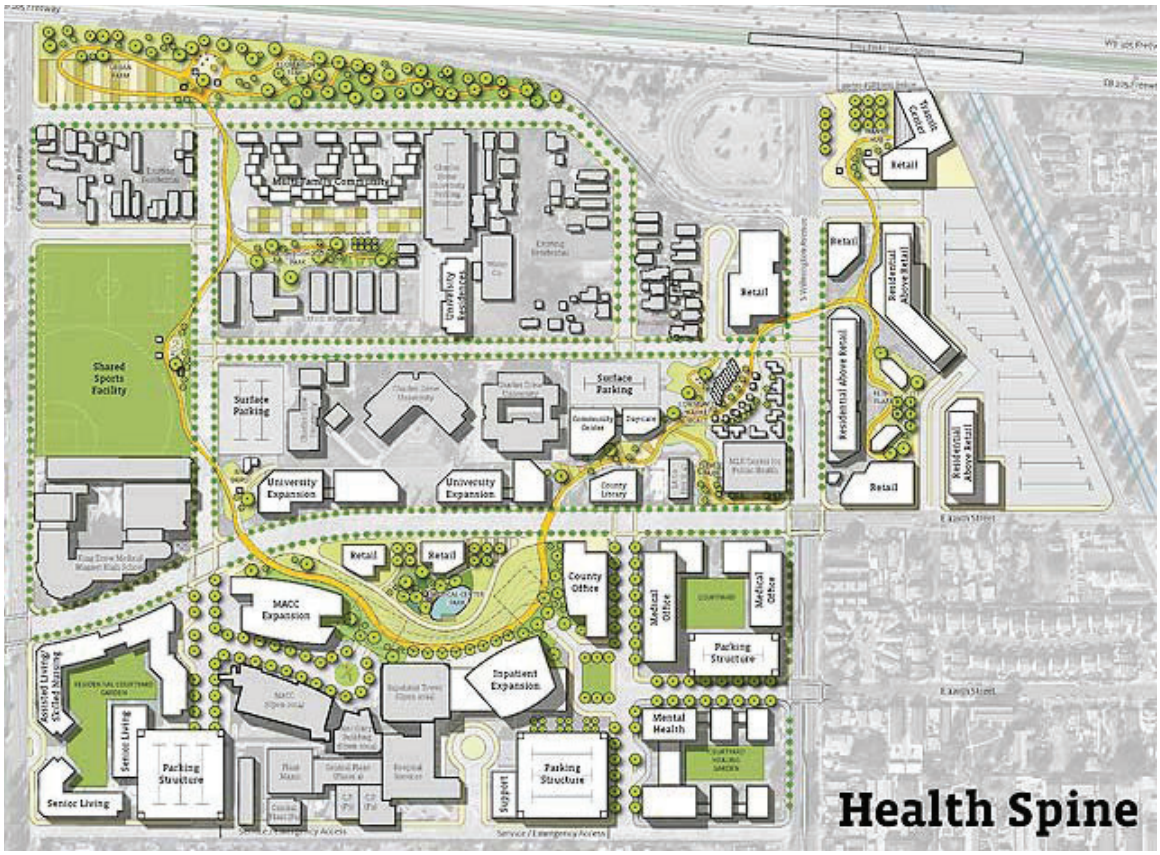


FIGURE 22 - MLK MASTER PLAN

20 YEAR PLAN

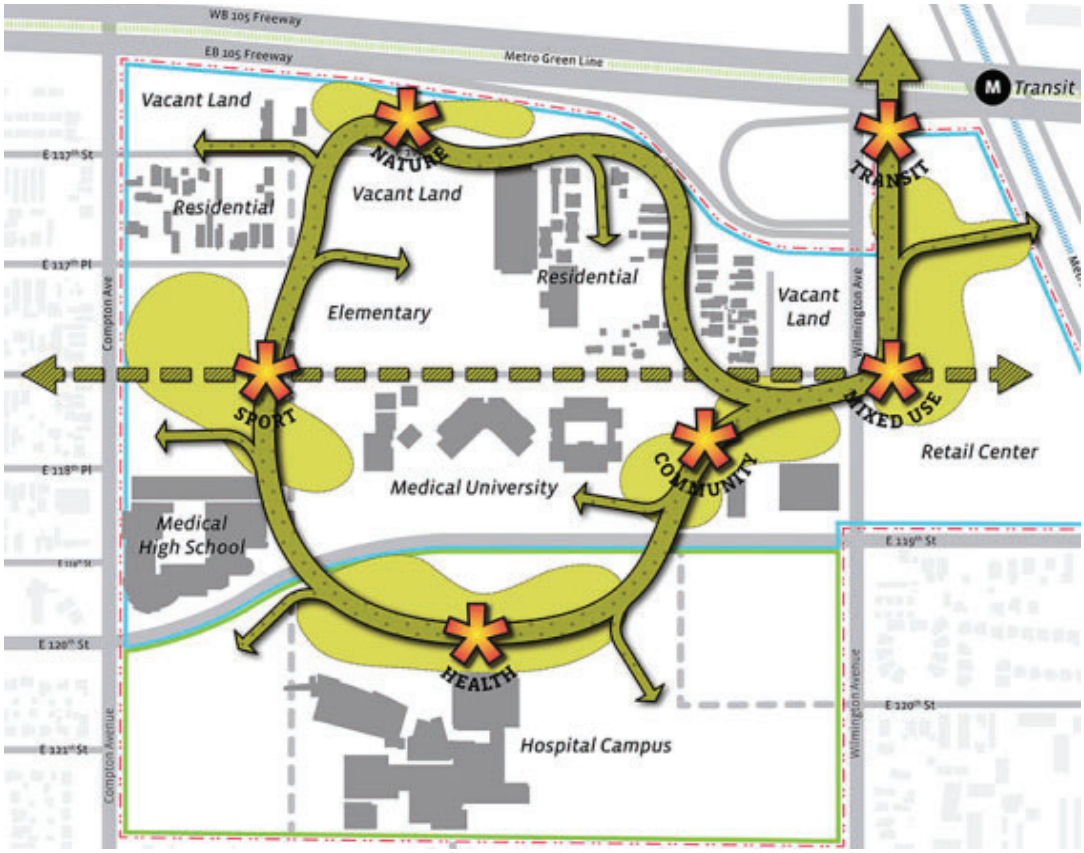
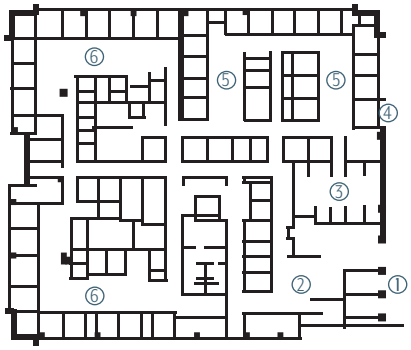


FIGURE 23 - MLK SITE KEY POINTS

FIGURE 24 - MLK SITE DESIGN

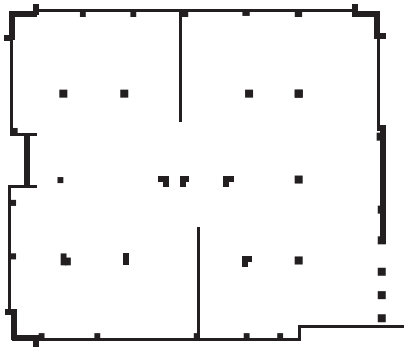
DESIGN FORM

First Floor:



① Entrance
② Emergency Waiting Area
③ Fast-track
④ Ambulance Entrance
⑤ Emergency Department
⑥ ICU

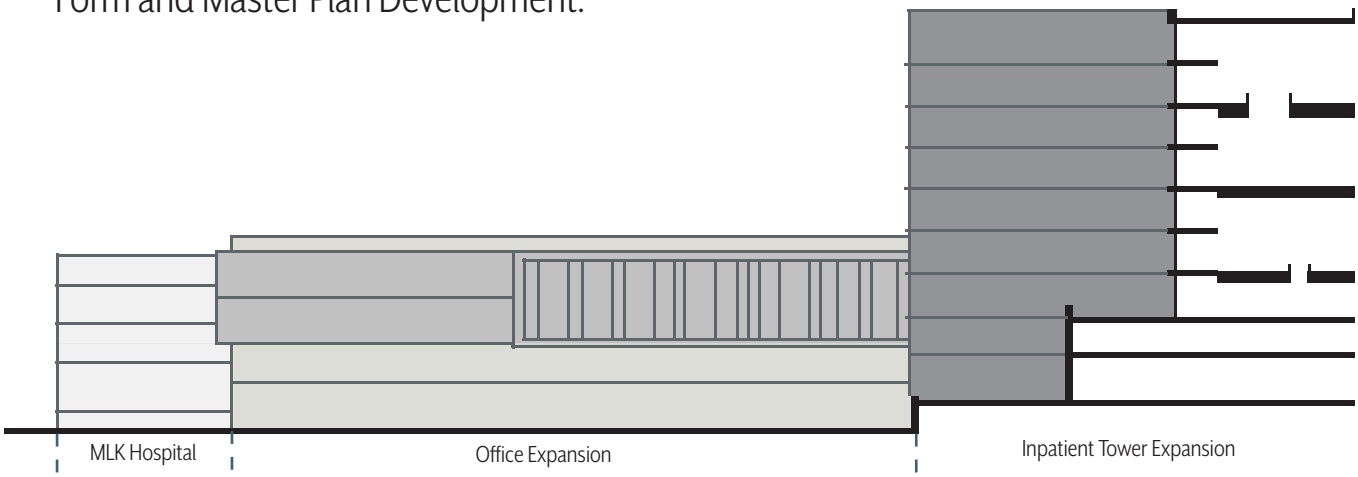
Structure:



Program:

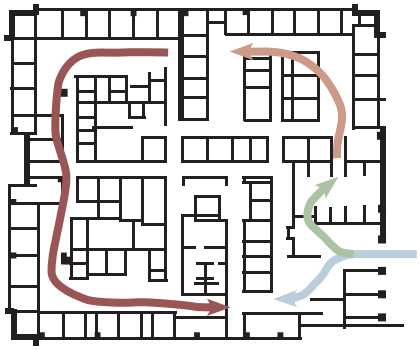
Public Space
Support Space
Fast-track
Emergency Department
ICU

Form and Master Plan Development:



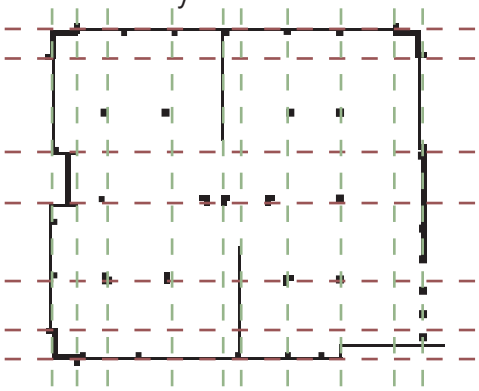
DESIGN FORM

Program Circulation:

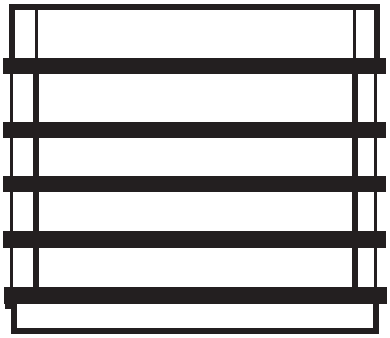


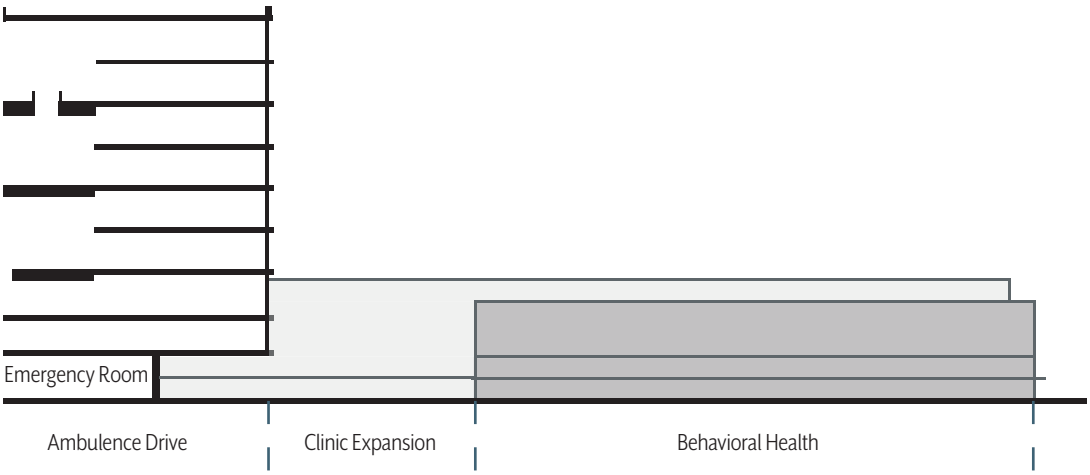
Circulation to Space:

Geometry:



Balance:





EASTSIDE HEALTH AND RECOVERY CENTER

Clinic + Transitional Housing

Architect: Ankrom Moisan Architecture
City: Portland, Oregon
Typology: Clinic and Transitional Housing
Square Feet: 199,000 sf (30,000 Site)
Name: Blackburn Building
Year: 2019

FIGURE 25 - EASTSIDE HEALTH AND RECOVERY CENTER

EASTSIDE HEALTH AND RECOVERY CENTER

Summary:

Founded by Central City Concern, Eastside Health is a clinical care, recovery center, and transitional housing facility. The team focuses on helping people recovering from addictions, mental health issues, and homelessness. With a predicted average of 3000 patients per year, Eastside aims to "serve people where they live" with walkability, access to community resources, and availability to transit systems (Central City Concern, 2017).

The design is aimed toward a climate response that further promotes the health and wellbeing of the residents. The architects wanted to keep in mind that different types of people will be present in the building, and that safety and comfort is different for each occupant (Ankrom Moisan Architects, 2018). The design will feature a variety of spaces to allow for privacy as well as a sense of community with other residents and staff.

When the building is complete in 2019, it will include affordable housing, healthcare facilities, pharmacy, and commercial retail space. The integrated housing and clinical services will focus on recovery and mental health services, with some targeted primary care as well (Next Portland, 2018).

"This facility also makes sure that the homeless aren't left to perish on the streets after being discharged from the hospital," referring to the hospice provided inside the building. "This facility serves as a catalyst project, offering much-needed care to Portland's highly dense homeless population."
-Mariah Kiersey, Principal Architect (Squires, 2018).

Community involvement will be a key component to running the facility. Support services at the building will include employment, housing placement, and coordination with other systems. Creating a transition between recovery and the community will strength the care that the patients receive.

GOALS FOR THE PROJECT

A New Home:

The concept for Eastside, is to care for a vulnerable population by providing a complex program for housing, case management, clinical care, hospice, and other stabilizing services to rebuild lives. Their main response will be towards transitional housing, homelessness, and healthcare (Central City Concern, 2017).

To achieve the feeling of "home" the designers used gabled roofs that are associated with family houses. These forms are then offset to achieve dimension and variety in the design. As part of the transitional housing program, the facility will support affordable housing, rehabilitation housing, and homeless housing while people aim for recovery and getting back on their feet in society.

While the design focuses on comfort, community, and safety, the location is also well placed for accessibility. The building is transit oriented to provide a variety of resources as the final transition back to the world.

LEED Gold:

The entire South roof is covered with solar panels to help power the facility. Natural ventilation is used throughout the residential units as an alternative to mechanical systems.

Other features such as low-flow water conservation and energy-star appliances have helped sustainability approaches, as well as the efficiency costs for the building. This is important because Central City Concern pays for all utilities while the residents and living at the facility.

FIGURE 26 - EASTSIDE INTERIOR

PROGRAM + DESIGN

Building Program:

First Floor:

- Public Clinic
- Pharmacy
- Urgent Care Center
- Acupuncture room
- Teaching Kitchen
- Classrooms
- Lounge
- Housing Entry
- Bike Storage
- Retail

Third - Fifth Floors:

- Employment / Sobriety Transitional Floors
- “Living Room” Group Space
- 4 Bedrooms
- Single Occupancy Rooms
- Staff / Interview Room
- Team Room
- Communal Kitchen
- Medication Room
- Shared Showers

Second Floor:

- Public Clinic
- Group Space
- Exam Rooms
- Administration
- Break room
- Lab Space
- Vaccination

Sixth Floor:

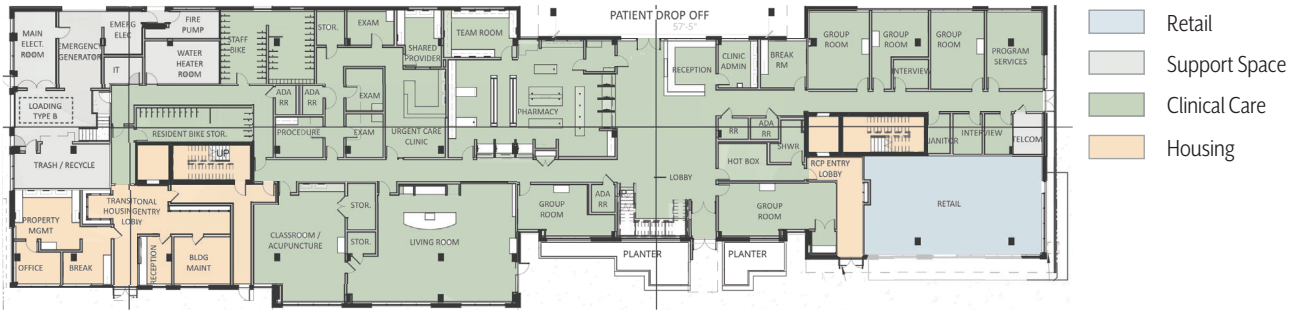
- Affordable, Long Term Studio Units (up to 2Years)
- “Living Room” Group Space
- 4 Bedrooms
- Single Occupancy Rooms
- Staff / Interview Room
- Team Room
- Communal Kitchen
- Medication Room

Totals:

- 119,000 Square Feet
- 34 Transitional Housing Studios
- 10 Palliative Care Rooms
- 80 Transitional Single Occupant Houising Units (SRO)
- 19 Respite Care SRO
- 8 Dorm Style Respite Care SRO

PROGRAMMATIC SPACES

First Floor:

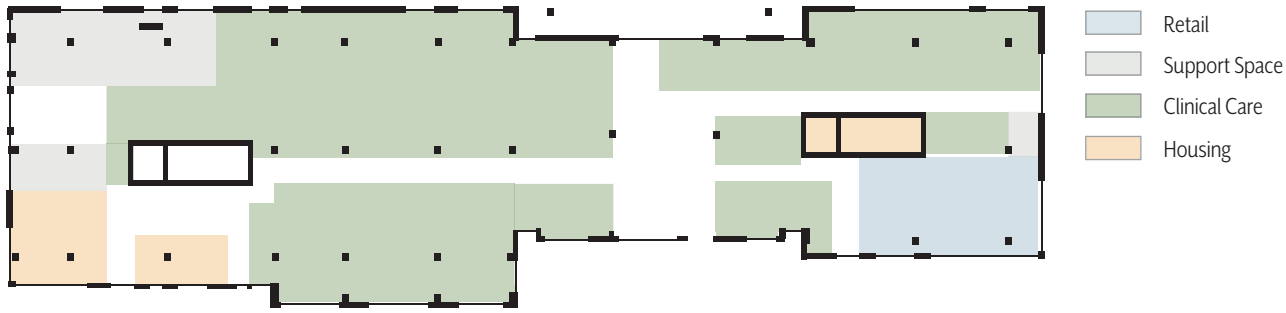


Second Floor:

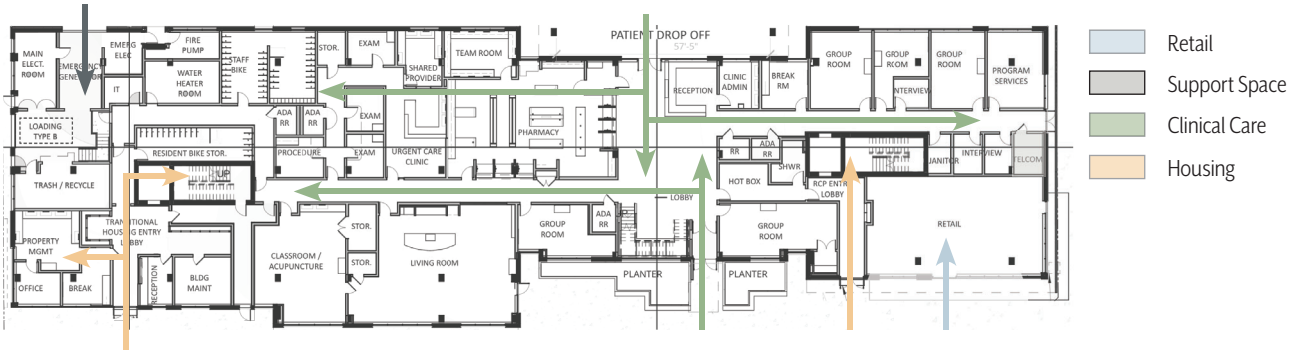
Third - Sixth Floor:

PROGRAMMATIC SPACES

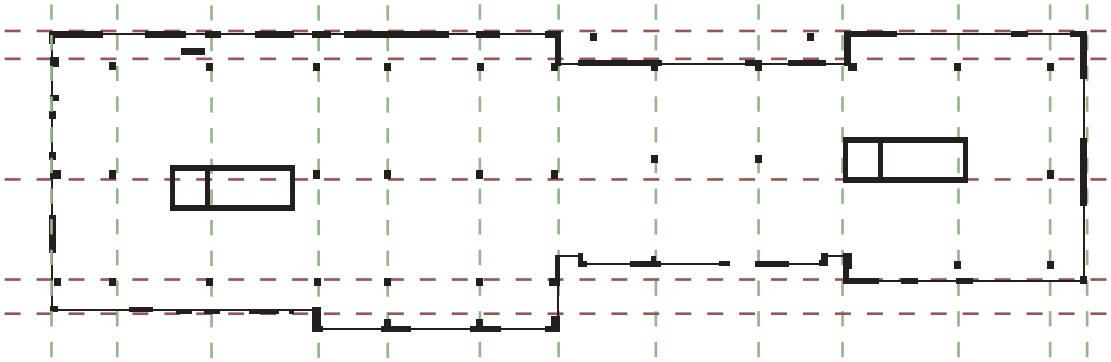
Circulation to Space:



First Floor:

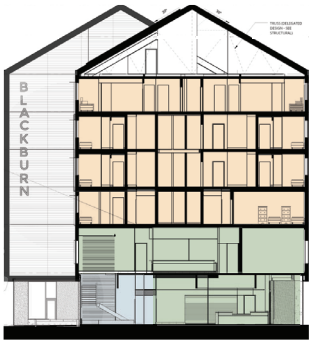


Structure and Geometry:

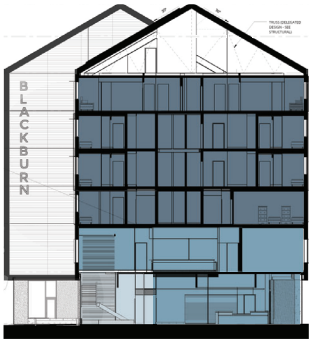


DESIGN FORM

Programatic Spaces:

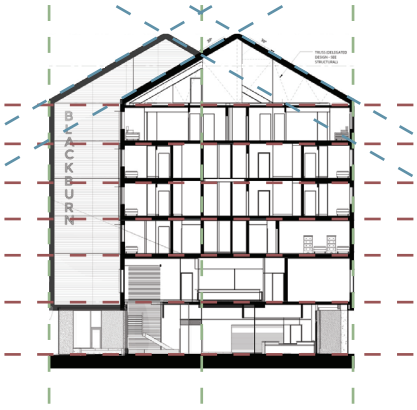


Heirarchy:

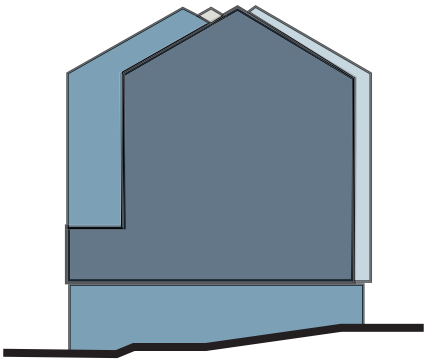


Symmetry:

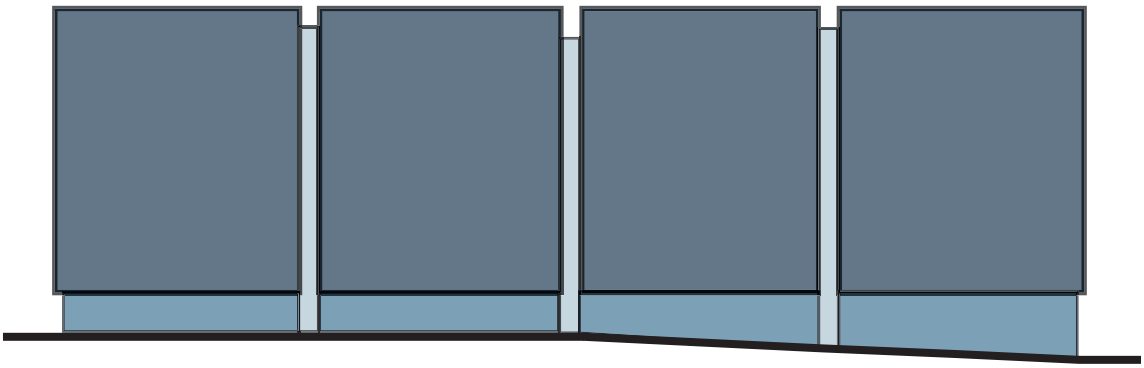
Geometry:



Form:



Form and Balance:



RESEARCH FINDINGS

HEALTHCARE + COMMUNITY CENTER

Meridian Center for Health: Seattle, Washington

Meridian Center is the same typology, size, and location of my intended project. I found the integration process for staff collaboration to be important to patient care and should be added into efficient design modeling. While this site is in North Seattle and this project will be in South Seattle, it has similiar demographic contexts and issues that arise around my site.

Meridian Center created a well defined connection between primary care and community needs. They focued on programs that will strengthen residents livelyhood, such as resume writing, education classes, support groups, and housing placement.

Martin Luther King Jr. Community Hospital: Los Angeles, California

While the typology is similar to the intended design, the larger scale of community lies on site connections to promote wellness, rather than a central community center. The scale of the project is much larger as a hospital rather than a neighborhood clinic. Despite this differences, the health disparities of education, low income, housing, and access to care correlation with the overall design intention. How the designers overcame the disparities provides a guide towards social context.

Eastside Health and Recovery Center: Portland, Oregon

Eastside's health system focuses on combining primary care with transitional housing. This is different from the other community centers that have been documented. This idea should be considered moving forward with the design as Seattle has a large low income housing and homeless population.

CONCLUSION

The current models for precedent research all stemmed from similiar social issues and health disparities in their society. Each approach represented the local issues in the neighborhood to promote health and well being.

VIRGINIA MASON MEDICAL CENTER

EFFICIENT HEALTHCARE MODEL

City: Seattle, Washington
Typology: Hospital

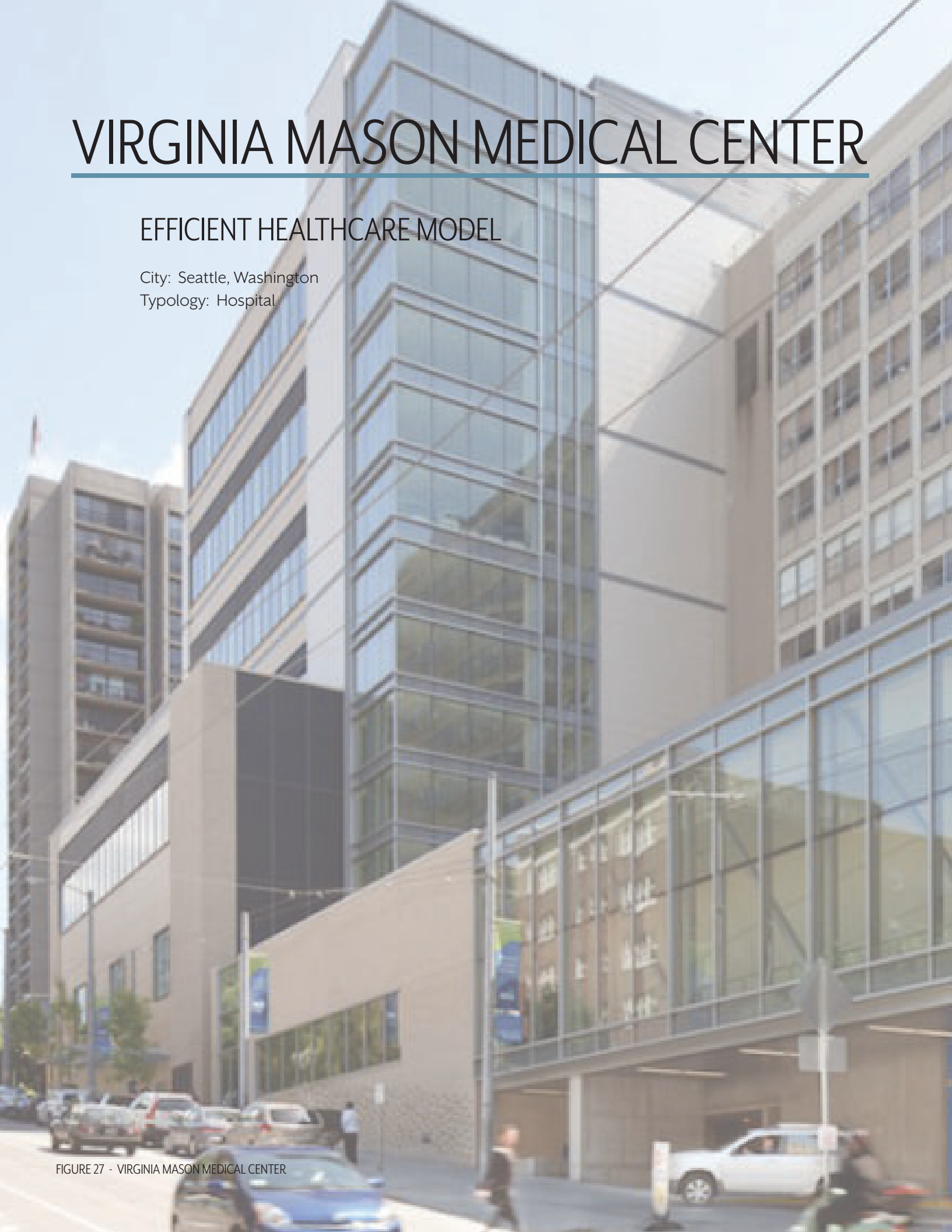


FIGURE 27 - VIRGINIA MASON MEDICAL CENTER

VIRGINIA MASON MEDICAL CENTER

Summary:

In 1998, Dr. Gary Kaplan, CEO of Virginia Mason Medical Center in Seattle, Washington learned that the hospital was losing money. He began looking into managment systems across the country that could save the hospital, but found his answer in Japan at a Toyota factory (Weinburg, 2011).

The Toyota Production Plan has made the company one of the world's most efficient manufacturers. The goal was to redefine production so that work flows smoothly from one step to another without waisted time, effort, or resources (McCarthy, 2006).

What he saw, he says, "was what's possible: that you can create products with no defects; you can have exactly what you need when you need it—and no more and no less—and have that happen every single time. It was the antithesis of what you see in health care." -Dr. Gary Kaplan (McCarthy, 2006).

Virginia Mason analyzed and reconfigured the model to streamline hospital and clinic operations within a medical center. Using the system, they were able to see where problems were located within their layout, and made adjustments to how they operate. Today, the Virginia Mason Production Model is used around the country to create more efficient healthcare systems.

Back in Seattle, the production team was able to reduce walking time, open up square footage, evaluate medical equipment, saving the hospital money. Any step that does not add value is reorganized to elminiate waste (McCarthy, 2006).

TOYOTA PRODUCTION SYSTEM

Redefining the Healthcare Model:

Created by Tiiachi Ohno, Toyota Company Engineer, the goal for the model is to define the essential elements and reform production so work flows smoothly from one step to another without wasting time, effort, or resources.

When Virginia Mason's system was failing, they looked to Tiiachi Ohno for help. He told them to "trace the path a cancer patient would take on a typical visit for chemotherapy treatment" (Weinberg, 2011). This led to the "Blue Yarn Effect" where Ohno and Dr. Gary Kaplan could visually see the paths that were taken by patients and the problems that they faced. Following the circulation from registration, to waiting room, laboratory, clinic, to chemotherapy, they saw a circular maze where patients would have to walk while their health is fragile and time is precious (Hochman, et al., 2016).

The exercise revealed that a patient had to travel 736 feet diring one visit. If the patient had to recieve additional treatment, the distance was over 1,300 feet. This influenced the doctors and designers to create a new system for healthcare efficiency. Today, patient travel around 126 feet for all services (McCarthy, 2006).

Value Stream Mapping:

Value stream mapping, is a similar approach to the same concept. It is a map of all the major processes and circulation pathways. Virginia Maso found that the staff was walking over 34 miles per day, and were able to free 13,000 square feet that was dedicated to storage and unproductive uses. By value map streaming, designers were able to eliminate duplicated services.

"Every value stream we've ever mapped—and we've mapped all our major processes—in every process there's been over 50% non-value-added time" - Dr. Gary Kaplan (McCarthy, 2006).

DESIGN ADJUSTMENTS

Patient Centered Care:

In the beginning, not everyone was happy about the new system. The new layout was set to meet the patient's needs, rather than the doctors preferences. Some physicians who previously had an office with a view, had to give up their space to make space for patient rooms. The design put patients rooms on the outside edges of the building, with large windows that provide natural light and views to Puget Sound (Weinberg, 2011).

Besides just relocating the patients, the designers aimed to create an environment of healing. They used natural colors, yellow for sunshine, brown to simulate, and greens for nature. They also included a water wall to finish the bioplilia approach (Weinberg, 2011).

Today, work between the staff is more collaborative. Doctors work from small, centrally located workrooms adjacent to nursing and scheduling teams. Better communication, faster problem resolution, and fewer errors have resulted from the transition (McCarthy, 2006).

One of the biggest sources of inefficiency in healthcare is the variations in practice and duplications of process. While the centrally located workrooms helped staff collaboration, other issues such as equipment and instraments were a problem. The staff laid out all their equipment and found duplications in supplies that can be used for multiple procedures. By elminating extra waste, they were able to reduce the number of instruments on a case cart by 60% (McCarthy, 2006). This method was also applied to support spaces, such as storage rooms, to see what is actually necessary for production.

Waiting Rooms:

Another Toyota approach was to go on a "waste walk". This was a way of quanitifying data, seeing where waiting rooms were located, and how much space was dedicated to each. Toyota's approach is that "waiting is a form of waste" (Weinberg, 2011). By designing the space as a way to put patients first, they were able to feather in patients from registration and are immediately taken to the exam room. This was a more efficient model for patient and physican consulation to be used in a timely matter. Using the Virginia Mason Production Model, Park Nicollet Healthcare in Minneapolis, MN was able to cut 50,000 square feet of waiting room space that originally cost $7.5 million to build (McCarthy, 2006).

"I see my patients getting into the room on time; I see my patients getting treatment without having to walk long distances; I see them not waiting." -Henry Otero, Oncologist (McCarthy, 2006).

EFFICIENT HEALTHCARE DESIGN

Virginia Mason Production System:

Since developing their own model from the Toyota Production Plan, the management method seeks to continually improve how work is done, aiming for zero defects. Using the method has allowed the staff to provide high-quality, safe, patient-centered care by eliminating waste and inefficiency processes (Virginia Mason Medical Center, 2018).

Virginia Mason's vision is to be the quality leader and to transform healthcare expectations. The program identifies seven aspects of waste: inventory, time, defects, motion, processing, transportation, and overproduction (Virginia Mason Medical Center, 2018). The key to making it work is trusting that those who do the work, know what the best solutions to the problem may be.

Benefits of VMPS:

- Patients spend more time with providers who are able to provide better care with zero defects.
- Greater safety and less delay in seeing patients in a timely matter.
- Team members benefit by having less rework and greater opportunities to care for patients.
- The oganizations operates more efficiently, with savings that are reinvested to improve patient health and well-being.
- The organization saved $11 million by using space more efficiently and freed 25,000 square feet of space using better designs (Virginia Mason Medical Center, 2018).

Results of VMPS:

- Reduced time for lab results reported to the patient by 85%.
- Reduced supply costs by $2 million through inventory reduction and 5S process. The standardization effors save more that $2 million per year in certain specialty areas.
- Reduced walking distance in the hospital by 750 miles per day, freeing 250 hours of time spent walking to patient care.
- Reduced labor expenses in overtime and temporary labor by $500,000 in one year.
- Increased productivity by 93% in targeted areas by moving supplies to points of use.
- Reduced premium for professional liability insurance by 76% since 2004 (Virginia Mason Medical Center, 2018).

VIRGINIA MASON PRODUCTION SYSTEM

Patient Centered Care:

The patient is always first. The objective is to improve quality and efficiency within the healthcare system to give the patient the best care possible. Lean healthcare methods are used to ensure that the entire process, including physicians and nurses, revolves around the patient. The new system reduces the amount of time a patient is present in the facility by 50% (Hochman, et al., 2016). Due to the new system, patient satisfaction increased to 90%.

Goals for the System:

Not every system is perfect, but Virginia Mason does their best to provide quality and safe care. The burden of work on team members is reduced due to the collaboration with colleagues and professionals. The spatial usage for the clinical setting allows for many new opportunities to maximize operational efficiency, leading to decreased cost of providing care.

Production Process:

- Admit the patient into care.
- Provide consulation and clinical visit.
- Preform surgery or necessary procedure.
- Send bill to patient.

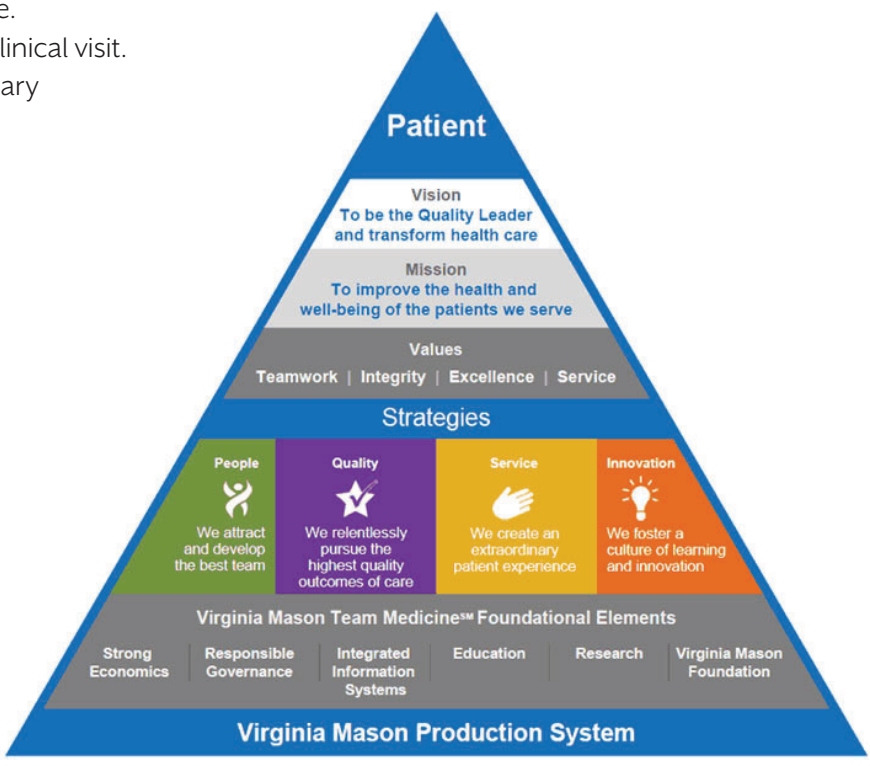


FIGURE 28 - VIRGINIA MASON PRODUCTION SYSTEM

PROJECT JUSTIFICATION

Health Inequity

Health and wellness are intrinsically linked to the built environment. Differences in that environment lead to inequity of people's ability to live healthy lives. Due to rising healthcare costs, many people are facing illness and injury untreated. The overarching goal of equality is to make public health available to all.

Unfortunately, not everyone is able to access the care that they need. Many people are not able to afford it, or communities do not offer the opportunities to be healthier. The social determinants of health, such as lack of healthcare access, shortage of food, education, community and family support, poverty, and home environment, are some of the leading causes of health inequities.

"Health equity means that everyone has a fair and just opportunity to be healthier. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness, and lack of access to good jobs, with fair pay, quality of education, and housing, safe environments, and healthcare."
-Paula Braveman, Health Affairs (Prevention Institute, 2018).

Seattle

The city of Seattle has both prospering neighborhoods and neighborhoods in poverty. Due to the increase in population and cost of living, areas within the city have been left alone, stuck with health inequities. Rainier Beach, a community in southeast Seattle, has the highest rates of poverty, lack of food access, and reports being in relatively poor health.

As an underserved population, the area has listed primary care as their number one need for the community. The determinants of health vary in each community on what they need most. Analyzing Rainier Beach's needs will help combine accessible care and community involvement into one facility. The overarching goal for the design will be to make it as efficient and cost effective as possible, so people who need help can afford it and access it.

Seattle offers a variety of healthcare facilities, but they are not properly placed for the people who need it or cannot afford it. By using location as a guide to make a clinical facility more accessible, people within the area and neighboring communities may get the care they need directly.

Personal Context

Growing up, I have been around healthcare facilities my whole life, with family working in different parts of the healthcare profession. They are able to help people in need who are sick, injured, or aid with their health. I would like to do the same. As a designer, this project is important for me to help understand what my family may need as staff of a healthcare facility, to provide better opportunities for them, as well as understanding how the future of the healthcare system may need to improve the lives of the community.

From an academic standpoint, I hope that this project will provide me with the skills to develop a well-rounded design, including cost and efficiency attributes as well as a communal studies within the environment. With graduation approaching, I am looking forward to the skills I may need when I start my professional career. Because I am interested in healthcare, I hope to learn what is needed in a healthcare facility and the surrounding community become knowledgeable in the system.

By developing a thesis that is centered around the social determinants of health, I will learn the effectiveness of communal design and how the environment effects the health of its residents. Not everyone has the same opportunities that form quality health and becoming aware to the situation may change my designs moving forward into future projects.

Over the past four years as an architecture student at North Dakota State University, I have learned about structure, passive and active mechanical systems, urban design, and how to design for a specific site. I hope that this project will allow me to combine all of those teachings into a cohesive design and learn about how our ideas may change to the community.

Future of Healthcare

How architecture effects the health of it's occupants is a relatively new study, beyond the factors of accessible ADA design. In the past, healthcare was needed to treat disease and injury that has spread due to poor living and working conditions. While this shaped the system as we know it today, it has produced many technological advancement and specialized care models with a focus on individual patient health. Today, we are moving into a new sector of healthcare that focuses on the prevention of chronic diseases. This will require a new healthcare model that combines the needs of population health and the urban environment to provide more opportunities for health and well-being to everyone.

PROJECT JUSTIFICATION

Healthcare systems have always been of need in the community and will be in higher demand as the population continues to increase. With the healthcare model we have today, we have seen technological advances, curing of diseases, and a focus on the needs of the patient. Because patient health is the most important aspect to healthcare, this design will act as an alternative model that addresses population health in greater context.

Goals for the Project

With the intension of designing an efficient healthcare model, I hope that this project will address the rising healthcare costs that prevent people from accessing the care they need. Because the environment plays an important role in our health, it is important to preserve the natural environment and make it as sustainable as possible. The design of the facility will include sustainable design practices to lower the cost of mechanical and operation systems. The savings may be used for patient costs that go towards "facility fees" found on each patient's medical bill. These fees are used to finance the operations of the building and services of the space used. By lowering the fees, the patient is charged with, we can create an affordable healthcare model for people to access the care they need.

For the design, I envision a healthcare system that uses the determinants of health as a guide to program the facility. This will include a primary care center, dental facility, and wellness and physical activity spaces. Because community involvement has been shown to impact the health and wellness of the population, the facility will also include a community center that has access to a healthy food kitchen, educational rooms, and a space for organizational meetings.

Most healthcare facilities address the needs of the healthcare on an individual patient scale, without addressing the direct needs of the community. By using health determinants as a guide, the impact may lead to better health and wellness, as well as a healthcare model that can be implemented in other neighborhoods in need.

HISTORICAL CONTEXT

Seattle

Today, King County is the 13th highest populated county in the United States and continues to grow. In 2016, they estimated a population of 2 million people, making it the largest metropolitan county in Washington state, with Seattle bringing in around 687,000 residents (Public Health - Seattle and King County, 2018).

Following the economic recession in 2008, Seattle has been the center of Washington's recovery. The median income had risen about $25,000 above the national average by 2015, but geography, ethnicity, and socioeconomic disparities have separated areas of wealth within the city.

Since 2010, King County has grown by more than 173,000 residents. The population is now 38% people of color, nearly three times higher than the past 35 years (Public Health - Seattle and King County, 2018).

As great as economic development is, it has left behind displacement for a number of Seattle residents. People who grew up and continue to live in their homes are being forced to move to more affordable areas in the city, which may not have as many opportunities for development or amenities.

In the 1970's, Seattle's Central District was once an area that was neglected and home to many different ethnicities, predominantly African American. While it became the center for civil rights movements, it also became plagued with poverty and crime. Development of the downtown district and demographic changes caused residents to move south towards Rainier Valley. While prices rose in the urban Central District, southern, suburban areas such as, Rainier Beach, became popular and more affordable.

HISTORICAL CONTEXT

Rainier Beach

Rainier Beach is located in the southeast corner of Seattle. Clarence D. Hillman developed most of the land in 1890s and named it "Atlantic City" because it included the nearby Pritchard Island, home to a Duwamish tribe village, and Dunlap neighborhood. In 1891, the trolley service finally reached Rainier Beach, and real estate boomed with new families moving to the south end of the city (Wilma, 2001). The area became popular due to the city's history in lumber trading and open land.

Settlements into Rainier Beach were very popular for a number of years. In 1903, Seattle Mail and Herald reported:

> *"Among the more remote, none seem to be taking on a more healthy growth than those which live south of town. Rainier Beach is perhaps the most desirable owing to its splendid scenic location where the Renton car line first touches Lake Washington." (Wilma, 2001).*

After the trolley service ended in 1937, settlements into Rainier Beach slowed. It wasn't a popular destination again until World War II, where it became home to post war efforts and the low-income population (Wilma, 2001). Because of the lower prices of homes than in other parts of Seattle, Rainier Beach was the destination for many ethnic groups and nationalities. Today, this diversity is part of their community identity, and what they are most proud of.

FIGURE 29 - RAINIER BEACH TROLLEY 1905

At a local level, Rainier Beach is said to be in one of the most diverse neighborhoods in the nation (Center for Community Health and Evaluation, 2015). In 1940, Southeast Seattle was 97% white population. Over the past 70 years, the area has become known for its ethnic diversity and immigration population (Seattle Department of Neighborhoods, 2013).

In the past 3 years, Seattle has been faced with substantial growth in both population and diversity. It is the first time that more than half the children in the King County are children of color. This increase in population has coincided with increase in cost of living, housing, and homelessness in the city (Public Health - Seattle and King County, 2018).

SOCIAL CONTEXT

Determinants of Health

Establishing a community's determinants of health reflect the conditions of the social, natural, and built environments. Solving inequity requires addressing these factors and using them to program the needs of the community.

In Seattle, there is an overwhelming difference between these factors in different communities. Southeast Seattle, Rainier Beach in particular, has some of the lowest health opportunities in the city. Factors such as access to food, low education rates, and poverty in the area has led them to health inequity. As an underserved population, the area has listed primary care as their number one need for the community.

Education:

As of 2012, 42% of Rainier Beach High School students were not graduating with 4 years, and half of those did not enroll in higher education within the first year of graduating (Seattle Department of Planning and Development, 2012).

"In King County, if 5% more people attended some college and 3% more had an income higher than twice the federal poverty level we could expect to save 548 lives, prevent 5,800 cases, and eliminate $32.8 million costs in diabetes every year." (Center for Community Health and Evaluation, 2015)

Poverty - Rainier Beach:

- Unemployment rate: 12.2%
- Median Household Income: $43,041
- Percent of population below poverty level: 23.1%
- Percent of owner - occupied units with mortgage that costs more than 35% of household income: 47.8%

(City of Seattle, 2013)

Income / Employment:

- Social -emotional development and health are lowest for residents living with incomes below the poverty level.
- Adults in poverty have higher ratings of heart disease and diabetes.
- The poorest Seattle neighborhoods are in the north, central, and southeast, near Rainier Beach.

Food Access:

Southeast Seattle has fewer opportunities for healthy foods. Rainier Beach is located in a food desert, and as a result, built Rainier Beach Urban Farm and Wetlands Project.

The Rainier Beach Urban Farm and Wetlands project lies upon the main road, about half a mile from the site. This could create a potential opportunity for partnership with the facility to donate their grown goods, and establish a food kitchen within the community center portion of the design.

SOCIAL CONTEXT

Determinants of Health

Mortalitiy Rate:

10 Leading Causes of Death:

- Cancer
- Heart Disease
- Alzheimer's Disease
- Stroke
- Unintentional Injury
- Chronic Lower Respirtory Disease
- Diabetes
- Suicide
- Influenza / Pneumonia
- Chronic Liver Disease / Cirrhosis

These causes of death have accounted for 85% of deaths in King County, 1/2 of these are considered premature. Many poor health and environmental factors lead to the onset of these problems. Southeast Seattle's life expectancy rate is 6.5 years due to health inequities

Chronic Disease:

- Adults with lower incomes are twice as likely to have a disability, diabetes, or asthma.
- Diabetes is the 7th leading cause of death, and can lower your life expectancy by 15 years.
- Percentage of Seattle residents with diabetes is highest in the north and southeast regions.

Hospitalizations:

- Residents in high-poverty neighborhoods were most likely to be hospitalized for unintentional injuries and for suicide attempts.

Mental Health:

- Adults with lower incomes are almost 15 times more likely to have experienced serious psychological distress than those with higher incomes.
- 6 % of adults reported experiencing depression and 16% were already diagnosed.

Physical Activity:

- Residents of south Seattle reported the highest amount of unhealthy days each month.
- Incomes under $15,000 reported 5 times as many unhealthy days as those above $75,000.
- Adults in the lowest income were 1.5 times more likely to be obese, and 1.6 times less likely to meet physical activity guidelines.

Access to Healthcare

Cost of Care:

- 10% of residents in Seattle are unable to receive treat due to rising healthcare costs or lack on insurance.
- 7 times as many people reported lack of insurance coverage in low income homes versus high income homes.
- 8 times as many people reported unmet medical needs as a result of cost.
- The number of uninsured Seattle residents rose from 10% to 12% after the 2008 recession.
- (Public Health - Seattle and King County, 2018)

Dental Care:

- 1/4 of Americans with private insurance are not covered under dental care.
- Nearly 1/4 of adults in King County reported having no dental care in the last year.

Primary Care:

- All of Seattle's neighborhoods are served by federally qualified health centers. These facilities are designated as Health Professional Shortage Areas because they do not have sufficient capacity to meet population needs (Center for Community Health and Evaluation, 2015).

Thesis Considerations:

Because this thesis project consists of establishing the determinants of health for Rainier Beach into a program base for a healthcare center, these statistics will be important in the function of the design.

From an intial view of social context, I see chonic disease, food shortage, physical activity, and poverty to be the biggest attributes to consider programmatically aside from primary care. These topics would be possible to develop by adding a food shelter and community garden as green space and provisions for food shortage, the bike path that runs parallel to the site serves as both public transportation, and physical activity access.

Southeast Seattle has the highest outcomes for disparities in the city. Poverty, ethnicity, language diversity, education, and access to healthcare are all factors in how the community has developed. By developing these community attributes, we are able to address the chronic disease onset of our society in a preventative care model.

PHYSICAL CONTEXT

Comprehensive Plan

Seattle:

In the 1990s, people from 38 neighborhoods throughout Seattle got together to create a 20-year vision plan for how each of the City's urban centers and villages would grow. Due to the growth within the city the following decade, changes in Seattle's neighborhoods included residential housing, infrastructure, and amenities. While each neighborhood is a part of the greater plan, some have developed more than others. In 2008, the Mayor and City Council decided to update the plans to develop new strategies that fit how the communities were changing.

The goals for Seattle's future are:

- Deliver services more equitably.
- Establish a development pattern that is environmentally and economically sound.
- Manage growth and change within the community.

Rainier Beach:

In the late 1990s, the community of Rainier Beach got together to form Rainier Beach 2014: A Plan for a Sustainable Future. Since it was released in 1999, they have opened the light rail, reconstructed the Rainier Beach K-8 school and library, improved Mapes Creek Walkway, and made investments in Kubota Garden. They have shown both pride and concern for the neighborhood to make positive changes for the community.

The goals for the community illustrated in the 1999 Comprehensive Plan, and the updates from 2012 include: creating a strong community, provide resources necessary to live a healthy life, and developing the urban environment to link services together (Seattle Department of Planning and Development, 2012).

Listed as a Residential Urban Village, Rainier Beach's area plan focuses on goods and services for residents and the surrounding communities, and less on employment concentration.

Community Goals

Strong Community

Rainier Beach's diversity is one of the driving factors of the community's plan for development. It is the most common description and positive aspect that community members identified for the area (Seattle Department of Planning and Development, 2012). The city has made plans to support its diversity is creating a multi-cultural center that fosters neighborhood identity, lifelong learning, and artistic creativity. Because of how diverse neighborhood is, the cultural center was proposed to allow everyone to come together, creating a supportive, welcome environment.

Lifelong Learning:

The community envisioned "an innovative, connected learning system that supports the integration of education into community life at all levels, and for all residents, resulting in the empowerment of the residents and the attainment of sustainable and beneficial changes in the community" (Seattle Department of Planning and Development, 2012).

By creating stong schools that promote programs and strong enrollment, the community hopes to improve it's education ratings. They would like to develop a community center that reinforces community connections to the youth by encouraging support in school programs and activities.

Arts:

Art involvement in the neighborhood is intended to allow different cultures to express their values and enhance neighborhood character. The idea is that by integrating public art into projects whenever possible, the youth and community members may become more involved in supporting eachother and different cultures.

FIGURE 30- RAINIER BEACH ART

PHYSICAL CONTEXT

Districts for Development

Station Area:

Due to its proximity to the lightrail station, this is the main entrance to the community and will be the location for the thesis site.

Beach Square:

Located in the middle of Rainier Beach, most schools and community programs center around this area.

Beer Sheva Park:

Functioning as the location for waterfront access, the park houses the Urban Farm and Wetlands Project.

Community Goals:

- Create a stronger linkage between districts along the main streets.
- Activate isolated areas with more pedestrian traffic, land use, design, and safety techniques.
- Build on community efforts to coordinate and organize improvement.
- Support urban wetland and food projects to create a social, healthy environment for residents.
- Support diversity and cultural centers throughout the neightborhood.
- Encourage education, art, and public green space for a social community.

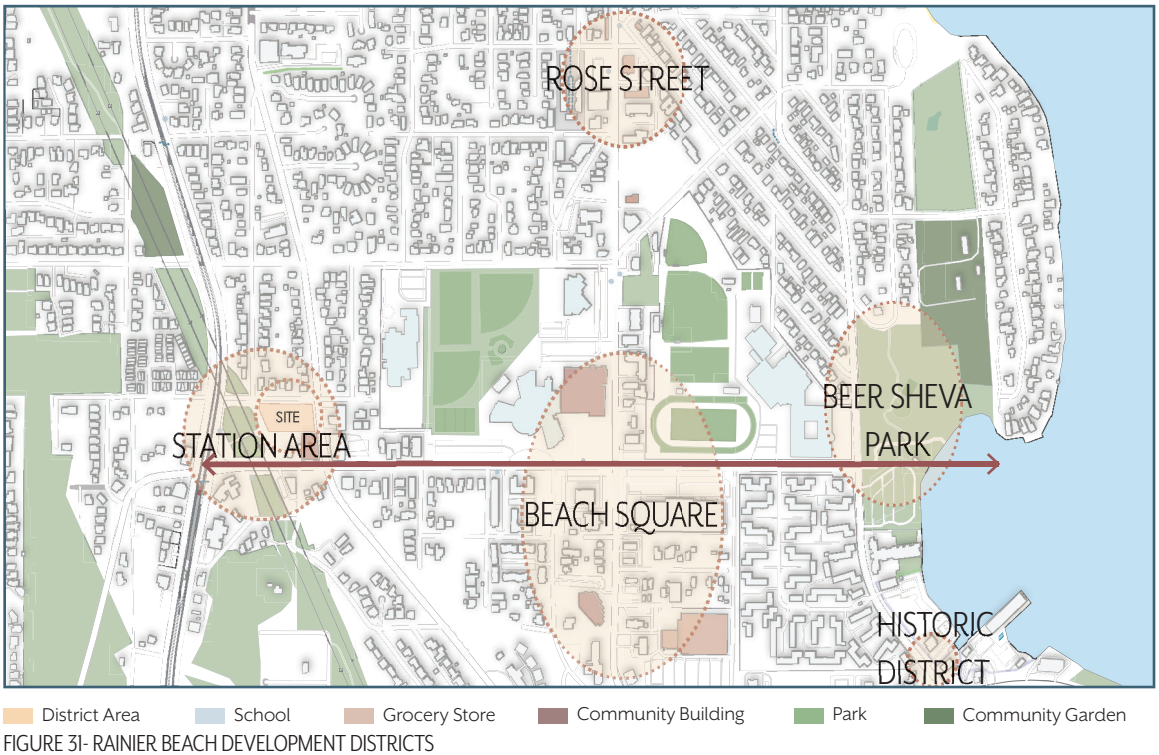


FIGURE 31- RAINIER BEACH DEVELOPMENT DISTRICTS

Station Area

The Station Area of Rainier Beach contains the site of the thesis project. Transportation is the main feature of thi area. Martin Luther King Way is the main road that leads from the Seattle city center to the entrance of the community. Along this road, lies the lightrail path. Many people use this as their main method of transportation to and from the city for work and school outside of Rainier Beach.

The goals for the area include a new turn around for the busses that go along Martin Luther King Way and S Henderson St. This new proposed route circles directly around the site, and the path was put into place, could be a vital source of transportation to the site

S Henderson St. runs in a direct line from the light rail station to the waterfront. Along this path are three schools, the library, and a grocery store. The community of Rainier Beach has proposed to develop the identity along this road to create a greater link for the station to the water.

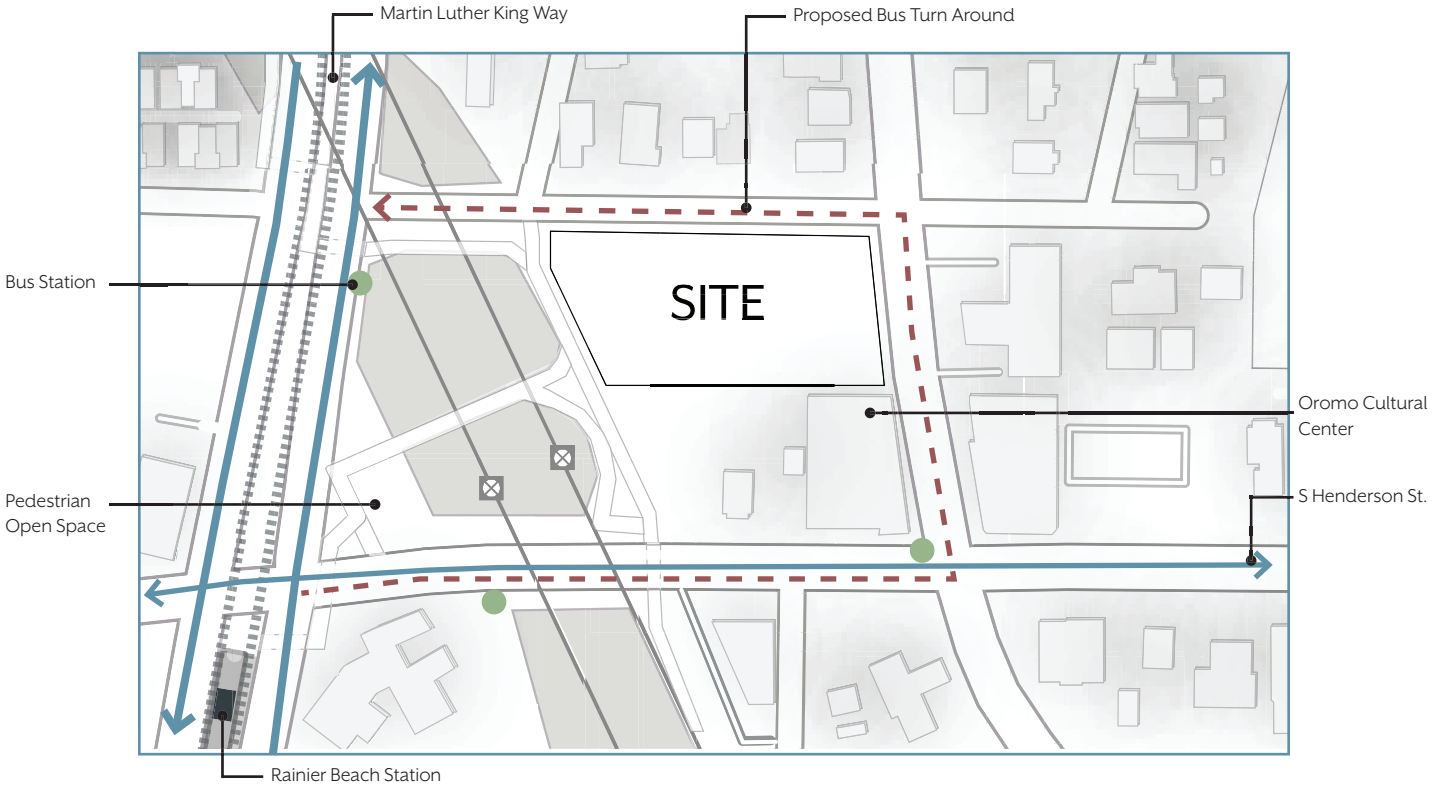


FIGURE 32- STATION AREA TRANSPORTATION ROUTES

RAINIER BEACH, SEATTLE

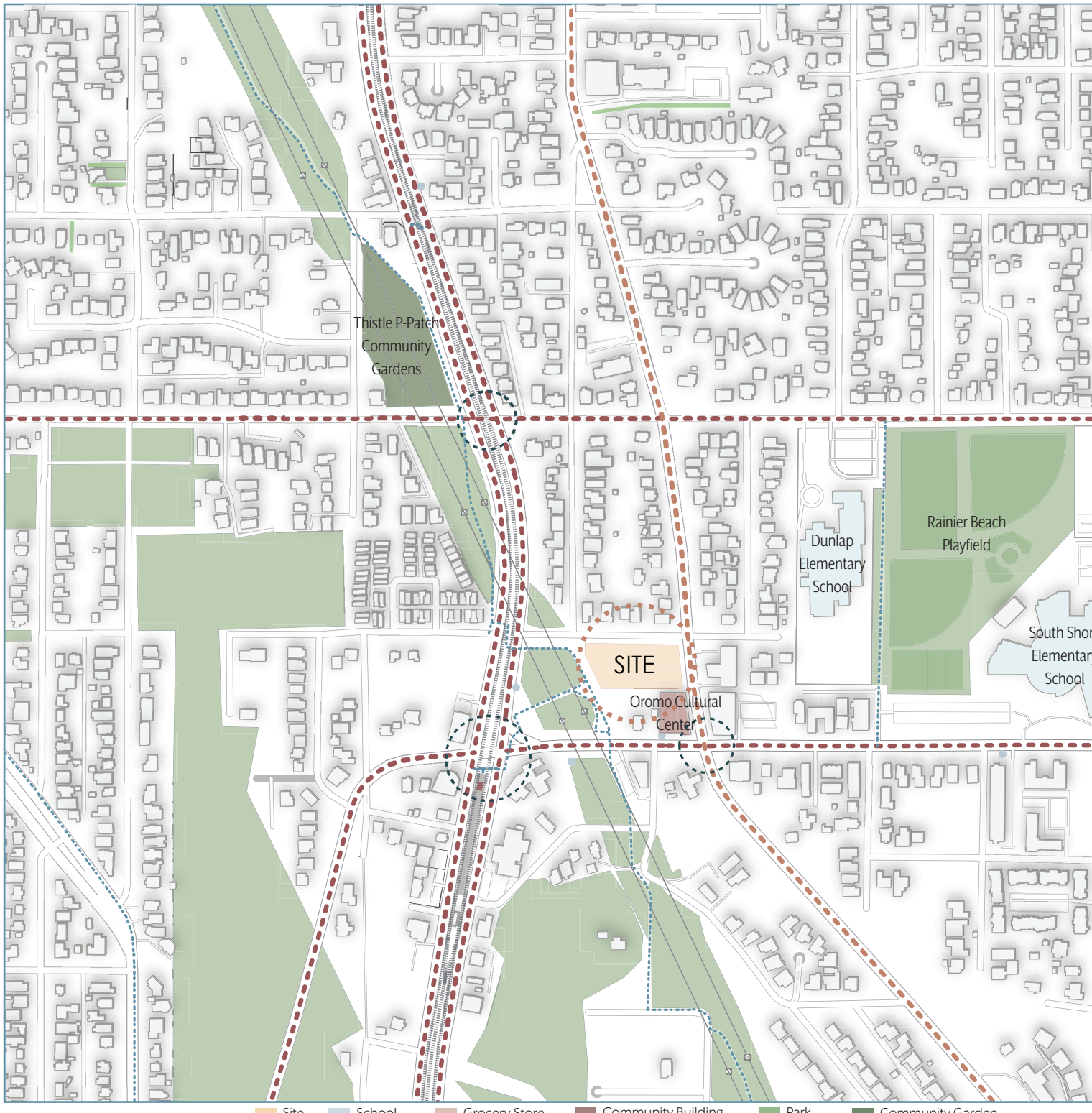


FIGURE 33 - PATHWAYS AND INTERSECTIONS

PATHWAYS & INTERSECTIONS

VIEWS & AREAS OF IMPORTANCE

IN

SITE

OUT

Highest elevation near site. Provides good views of the site.

Open area for bike share and pedestrian shelter. Serves as entrance to the community.

Green space that includes power lines for the city and bike path for physical activity.

Rainier Beach Lightrail Station.

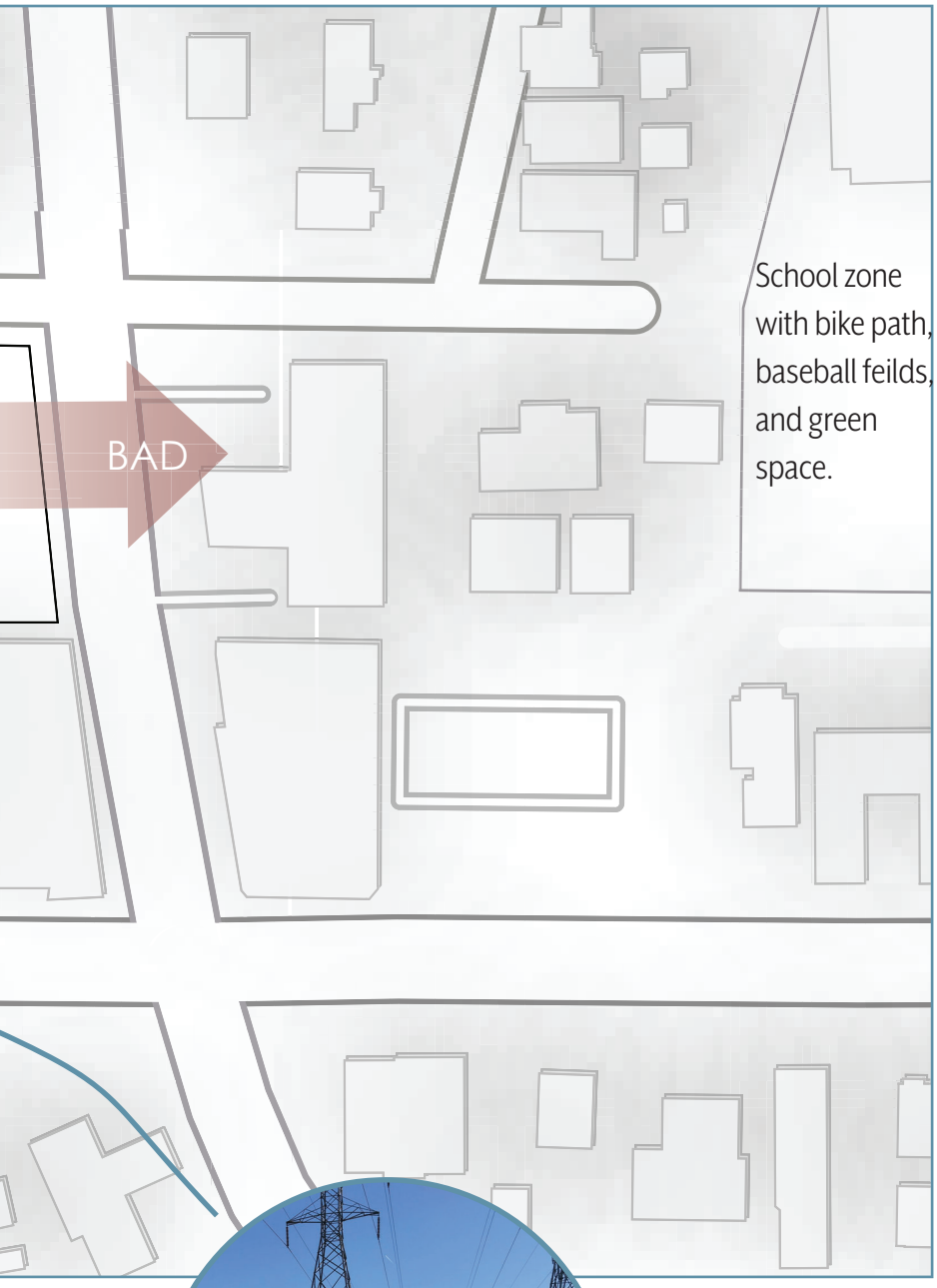


FIGURE 34- AREAS OF IMPORTANCE

While Rainier Beach as a while is known as a health disparity, the area around the site provides opportunities for community improvement.

Serving as the entrance to the neighborhood, the site is near Rainier Beach Lightrail Station. It also has many opportunities for physical activity, such as a bike path and pedestrian zone, with more space for improvement, such as community garden or play area.

SITE ANALYSIS

Potential Development

While health inequity is a problem in Rainier Beach, the site location has many opportunities for improvement. The site is adjacent to Renton Ave S, which is just off one of the main roads of the community and the entrance to the community. This location brings in a steady amount of pedestrians from both the green space from the west and roads to the east. The site is adjacent to city owned power lines that disrupt views from the site, but provide a large amount of green space and a bike trail for physical activity.

One of the key features of Rainier Beach is it's diversity. They are proud of their ethinic community and want to show pride through art, organizations, and cultural development. To the south of the site, Oromo Cultural Center is a non-profit organization that promotes spirituality, art, culture, and education within the community. Creating a healthcare center and community center that can help support the beliefs of this organization will build social ties with community members.

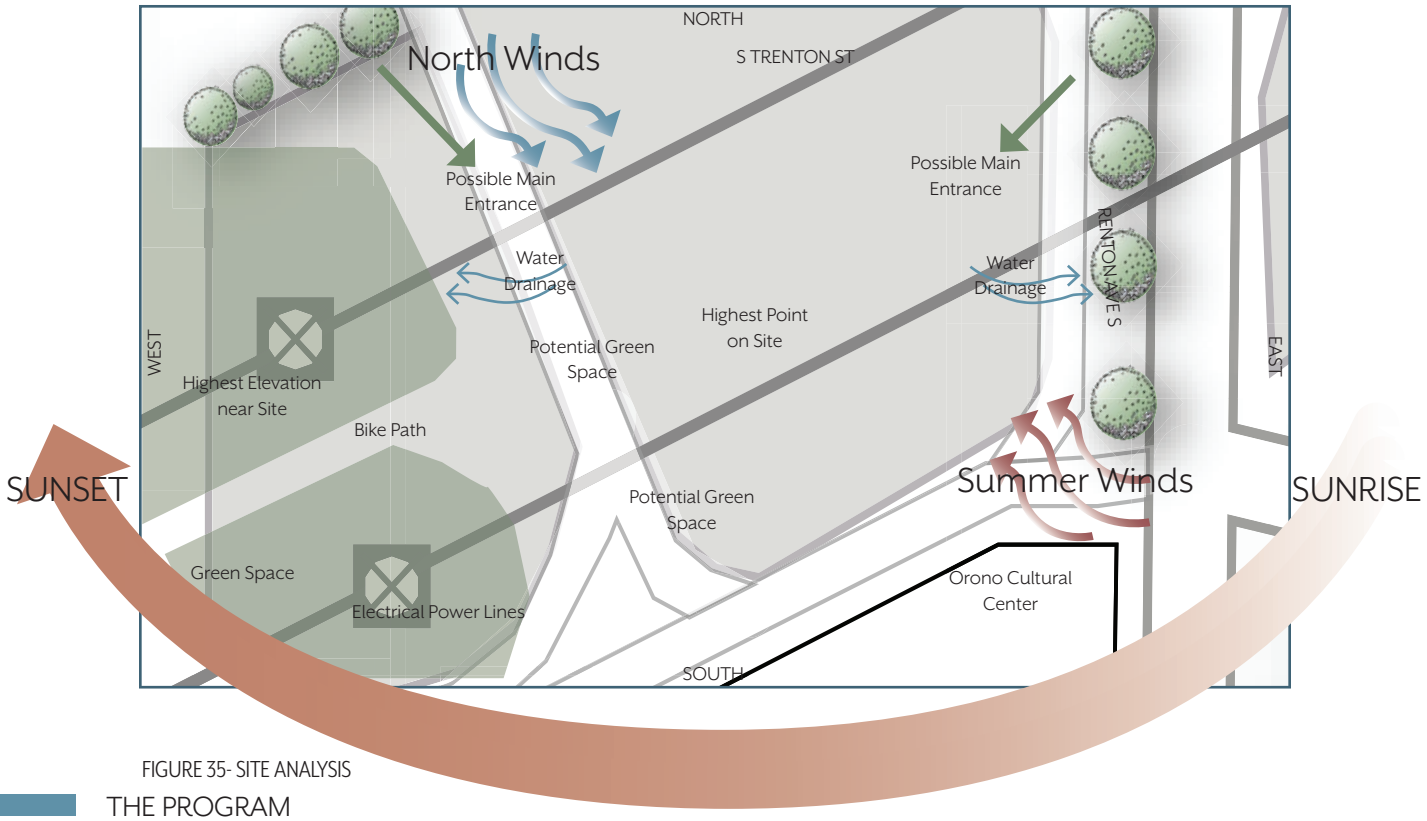


FIGURE 35- SITE ANALYSIS

TYPOGRAPHY

Site Contours

The typography on the site slopes from both the East and West, leaving it highest in the center. To the west, the elevation starts at its lowest point, but rises quickly nearby creating a hill separating the lightrail from the site. This hill obstructs views of the lightrail, but does a good job in creating a sound barrier to the site. The hill also functions as a base to the electrical lines that run adjacent to the site. These electrical lines are owned by the city and can not be built upon, but have been placed high enough that pedestrians do not interfere for safety reasons. At the base of the hill, there is a bike path that is kept at a moderate level for easy mobility.

In the event of rainfall, most water will shed from the center of the site in both the east and west directions. The water that is directed towards the east will be lead to the sewers on Renton St. S, but the water to the west will need to be redirected towards S Trenton St as the tyopography is lowest between the site and the hill. This may be a good area to place a retention pond as a natural drainage system.

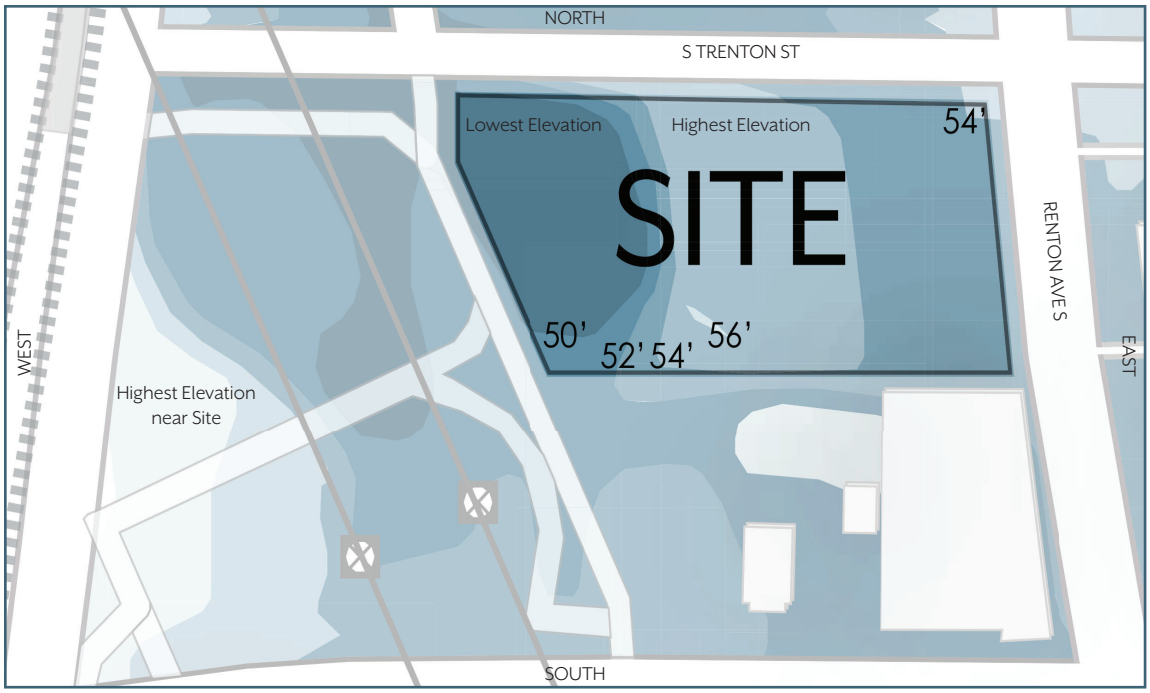


FIGURE 36 - TYPOGRAPHY

BOUNDARIES AND ZONING

Zoning:

- Zone Type: NC2P - 40 (Neighborhood Commercial 2 Pedestrian)
- Height: 40 feet
- FAR: N/A
- Uses: Medium Sized Grocery, Drug Store, Coffee Shop, Customer Service, Medical/ Dental Facility and apartments.
- Building Types: Single-purpose structures, multistory mixed use, residential
- Max Size of Commerical use: 25,000 sqft
- Pedestrian Zone: Encourage pedestrian oriented, retail, shopping district with little transportation.

Boundaries:

- Lot size: 29,961 sqft
- Acres: .6875
- Parcel Number: 6804100005
- Streets: S Trenton St, Renton Ave S

FAR Chart

Type of Development	Height Limit					
	30'	40'	65'	85'	125'	160'
	Maximum FAR					
Residential-only or nonresidential-only	2.25	3.00	4.25	4.50	5.00	5.00
Single use within mixed-use development	n/a	n/a	4.25	4.50	5.00	5.00
Mix of residential and nonresidential uses	2.50	3.25	4.75	6.00	6.00	7.00

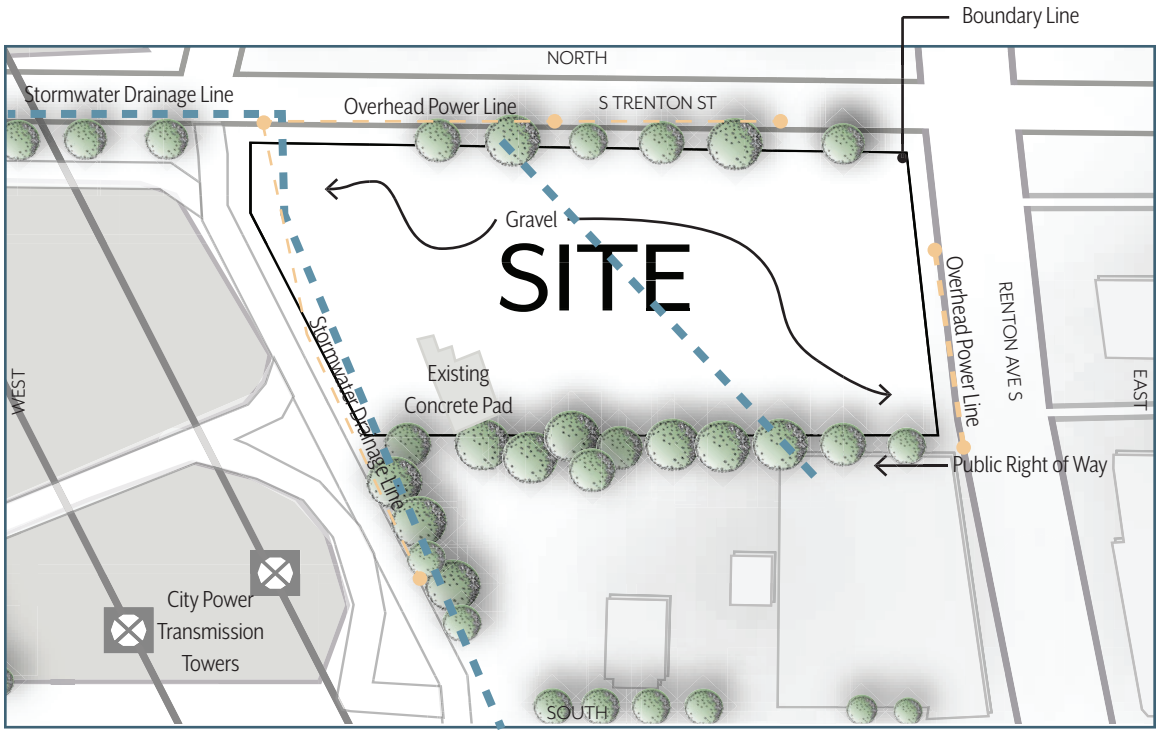


FIGURE 37 - UTILITIES

Circulation

Bounding the North and East sides of the site, Renton Ave S. is the lane of traffic most commonly used to get to the site. Along this road lies Oromo Cultural Center and the Somali Services of Seattle. These areas represent the diversity that Rainier Beach pride's itself on, and should be used as partnership in future developments. To the north, S Trenton street serves as a residential road with single family homes across from the site.

On all four sides of the site, there is pedestrian access. The most common routes are Cheif Stealth Trail and the sidewalks around S Trenton St. and Renton Ave. S. The public right of way is not easily accessible due to movement through the trees and blocking by buildings and fencelines on either side. The best locations for a new entrance would be at the corner where the two street lines meet. It would be beneficial to have a secondary entrance near Cheif Stealth Trail for pedestrians to come from the lightrail and not have to walk all around the site.

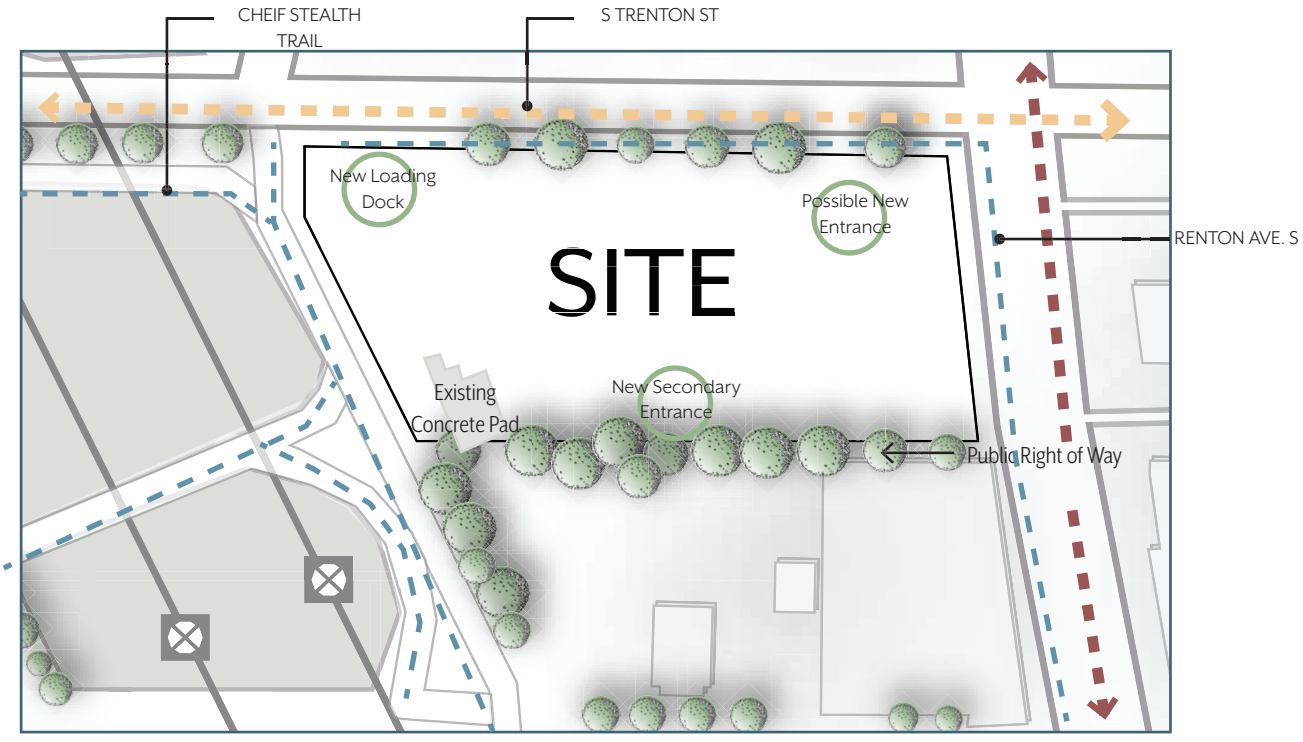


FIGURE 38- SITE TRAFFIC

SITE CHARACTER

At first glance, the site looks plain and worn down. It is fenced off, preventing people from entering the space and is surrounded on one side by old homes and commercial buildings. The ground is rocky and undermaintained, having you believe it is a bit of an eye sore. Under further investigation, you can see that the site is surrounded by vegetation that takes on a colorful state in the fall, and at the top of the hill to the west, you can see the mountains across Lake Washington beyond the trees.

While there are changes in elevation, it is fairly flat and allows for plenty of development opportunities. The bike path makes pedestrian traffic available from the north, east, and west sides, while the Oromo Cultural Center to the south provides partnership opportunities for development. Because the site is fenced off, there was no public activity on the site while visiting, but the Cultural Center parking lot that is shared with the site had a group of people playing games and making the best of the space they have.

The best views from the site are looking to the south west, while the power lines break the view, the vegetation, hills, and color makes up for the electrical structure. Whilel the site may not have the best view, it makes up for it in location. It is situated in a way where is is accessbile by the community and surrounding neighborhoods that may need care. It also has many opportunities for open space, physical activity, and community involvement that is the focus of the thesis project.

FIGURE 39 -SITE CHARACTER

SITE RECONNAISSANCE

Southwest:

Looking southwest of the site, you are able to see the main street and entrance to Rainier Beach. While the power lines that run adjacent to the site may become a hazard, the green space and bike path have been kept up by the city for pedestrian use.

Northwest:

Looking northwest, we are able to see where the bike path transitions to residential housing. These homes are on the outskirts of the community and lie adjacent to the lightrail line.

Northeast:

Looking northeast, this view provides an access to the street with lots of vegetation and an entrance to the alley of residential homes.

Southeast:

Looking southeast, we are able to see the main road access to the site. We are also able to see Oromo Cultural Center that would provide opportunities to create partnerships between culture and community.

FIGURE 40 -SITE RECONNAISSANCE

CLIMATE

Basic Climate Condition

FIGURE 41 - CLIMATE REGION 6

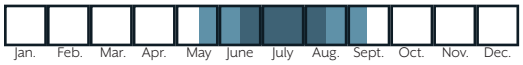
Seattle, WA falls into climate region 6, according to ***Heating, Cooling, and Lighting*** by Norbert Lechner. This zone features a very mild climate, where cool temperatures and rain are common in the winter. The annual rainfall is around 20 inches typically. Even with overcast skies, Lechner reports that solar heating is still possible due to the small heating load by the mild climate. After visiting with local residents, they reported that the most favorable time of year as well as sunniest, is between June to October 1st. Outside of this time zone, it is often rainy and dreary.

Design Considerations:

- Keep the heat in and the cold temperatures out during winter months.
- Let the winter sun in. It is often diffused due to overcast skies.
- Protect the surface from cold winter winds.

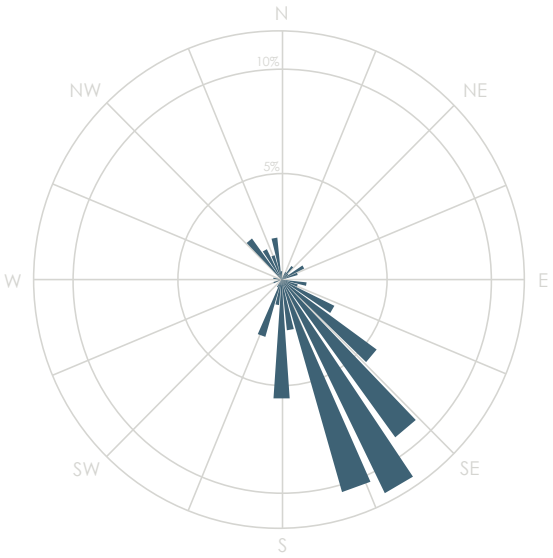
Comfort:

	% of Year
Comfortable Period	14%
Too Hot	20%
Too Cold	66%

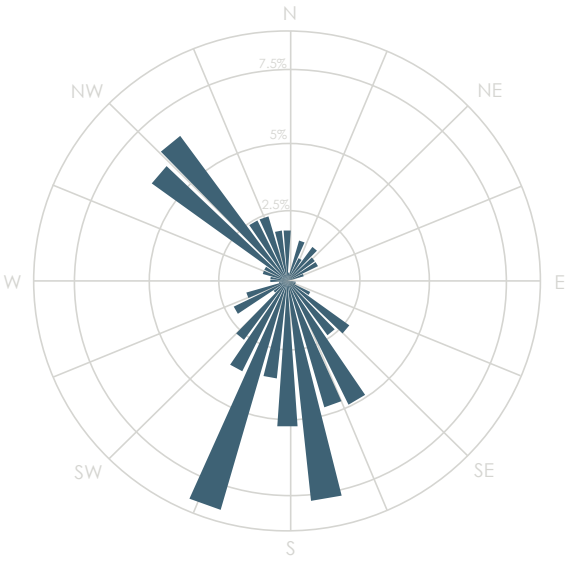


Prevailing Winds

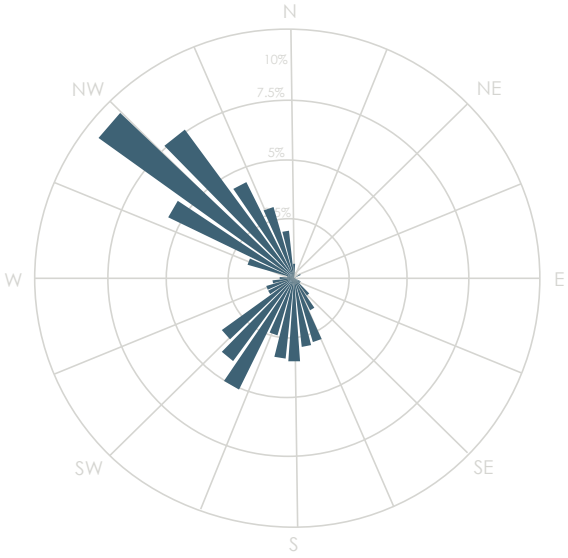
Winter Winds



Spring Winds



Summer Winds



Fall Winds

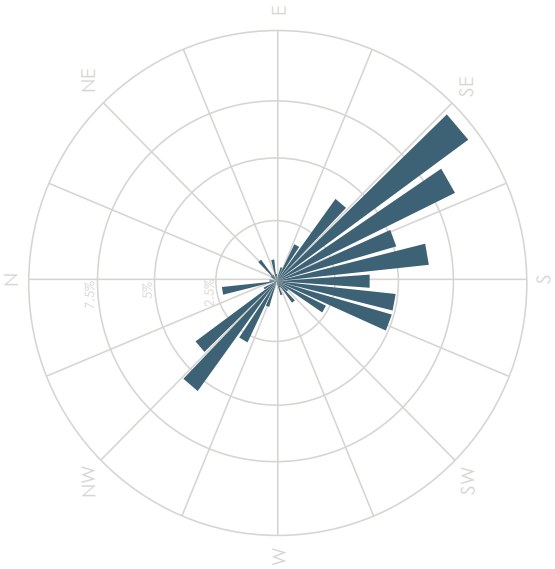


FIGURE 42 - SEASONAL WINDS

SOILS

Geotechnical Report

A U.S. Geological Survey states that the area the site lies within is alluvium with vashon recessional lacustrine deposits (U.S. Geological Survey, 2005). Alluvium is described as a combination of sand, silt, gravel, and cobbles that has been deposited there by streams, running water, and occasionally landslide debris. Recessional lacustrine deposits are laminated silt and clay that has been deposited by slow-flowing rivers and lakes.

Soils Report

According to a geotechnical report done by PanGEO, Inc., the test logs done on the site proved consistant with the U.S. Geological Survey (PanGEO, INC, 2017). The first zone consists of 4'- 5 1/2' deep of loose to medium dense fill material comprised of silty sand with gravel mixed in. The second zone below the fill contains 1/2' to 1 1/2' of thick soft peat material. The third zone consists of underlyin, stiff recessional lacustrine deposits. While the survey lists zones of perched groundwater seepage in the report, the depth of the groundwater is between 1-11 feet depending on the layout of the land.

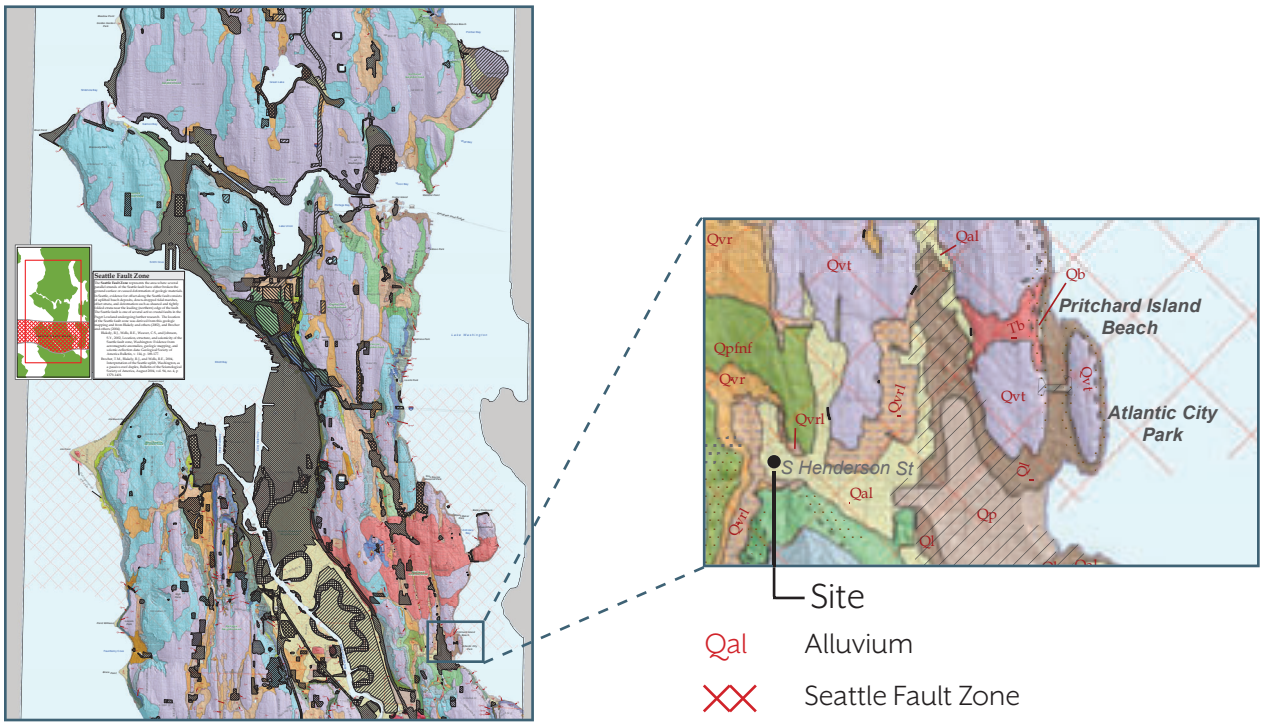


FIGURE 43 - GEOLOGICAL SOILS

SEISMIC CONDITIONS

Seattle Fault Zone

The Seattle Fault is a zone of multiple shallow east to west thrust faults that wind through the Puget Sound lowland. Earthquakes are the most serious natural disaster that Seattle may face.

The Seattle earthquake hazard map to the right shows the ground shaking frequencies if an earthquake were to occur. These shakes would at frequencies of 1 cycle per second.

The site in Rainier Beach is near the bottom of the fault zone, as shown in both figures on the right and left. As it is in the 30 - 40% range of the spectrum, it should not be effected as bad as other areas of the city.

RAINIER BEACH SITE

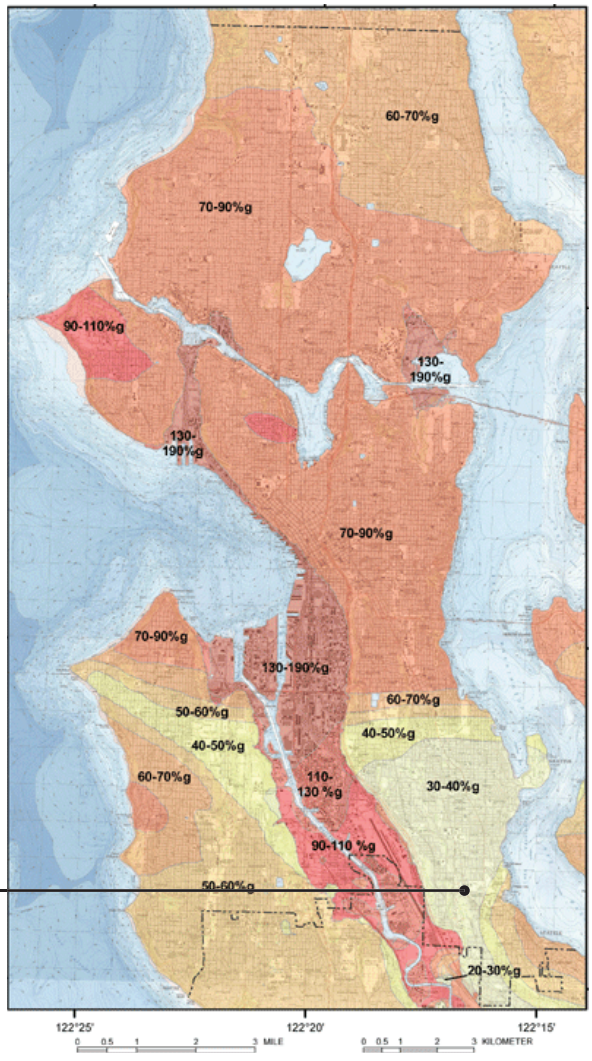


FIGURE 44 - SEISMIC ZONES

PERFORMANCE CRITERIA

Performance Measurements

As healthcare costs continue to rise, more patients are forgoing care because they are unable to afford it. With an efficient design model, operational costs may be lowered and the facility fees a patient finds on their medical bill may be less significant and more affordable, so they can receive the care they need.

The project will require a variety of design measurements for analysis. To make sure that the design meets the goals of creating an efficient healthcare model, as well as becoming more affordable for patients and operations, I will be conducting a series of cost analyses that will compare different aspects of the design, including sustainability approaches, location and land cost, and patient billing procedure.

In addition to efficiency, social and environmental impact will be analyzed to see if the design benefits the community. Health inequity is a problem in many communities, including Seattle's Rainier Beach neighborhood, and may require specific needs that reflect their determinants of health to help them achieve positive health and wellbeing.

Measurement Sources

I will be using a variety of sources to develop my project and research. These programs include Excel, to calculate the cost benefits and analysis and Revit and AnyLogic, to design the layout and spaces needed for a healthcare facility. While these programs will define a quantifiable result based on the performance of the building, as well as the success of the project goals, other sources are more qualitative.

To program the facility and define the needs of the community, I will be looking at research documents, such as Community Needs Assessments, the city of Seattle's development plans, and site's connection to human health. These will serve as a guide to begin the basic needs, with goals of continuing the idea of community services farther into a comprehensive design. This facility should become a place to go when one is ill, as well as when they are well. To do this, it needs a combination of community services and clinical services working together to serve the community.

Performance Analysis

To calculate and analysis the measurement for the desired criteria, I will be conducting a series of simulations and digital models throughout the length of the project. Because the goal of the project is to develop an efficient healthcare model and make it more affordable, simulations must be conducted for the layout of the facility, space and adjacency requirements for each room, and walkable distances for patients to make sure that the project is valid. To make the necessary calculations, I will be putting a series of different healthcare layouts from Revit into AnyLogic's efficiency software to find the best room layout and location, time response and process of care delivery, and patient centered design.

The final design criteria that will be analyzed is how it will impact the users and the environment. This is more difficult to measure because it deals with how people use the space and if it is helpful to live a healthier life. While simulations can not be conducted on this topic, I will be using the specific determinants of health that are found in Rainier Beach's community and use it to program different spaces within the building the residents may use in addition to the typical healthcare requirements. For example, a large part of a person's health can stem from social interaction and community involvement. By combining the needs for a primary care facility and community engagement, the facility may become a space for people to go when they are ill, as well as when they are well.

Performance Judgement

To judge whether the project meets the performance criteria and is beneficial to the community, I will be comparing it to other healthcare models, both to see if it's efficiency is improved and more cost effective, as well as a precedent model base to see how their designs have impacted the community. While partnerships between healthcare and community organizations are becoming more common, it is a relatively new movement by healthcare systems and will require further research on the combination of the two facilities.

As a new city ordinance, Seattle has set an allowance of increased height and bulk to new and renovated buildings that reach LEED Silver. As a goal for the thesis project, I will be aiming to reach LEED Gold in hope that more healthcare facilities will become sustainable in the future.

SPACE ALLOCATION

Clinical Space Allocation Table

SPACES	SQFT TYP.	/ LARGE
Public Area		
Reception	65 sqft	120 sqft
Gift / Flower Shop	100 sqft	
Buisness / Financial Services	65 sqft	100 sqft
Admitting / Discharging	65 sqft	
Pharmacy	100 sqft	
Waiting Area	150 sqft	250 sqft
Clinical Area		
Exam Rooms	120 sqft	140 sqft
Consulation Room	120 sqft	
Labratory Space	120 sqft	
X-ray	100 sqft	
Nursing Stations	150 sqft	200 sqft
Library / Resource Center	0 sqft	50 sqft
Medical Records	60 sqft	150 sqft
Doctor's Offices (or shared)	120 sqft	160 sqft
Communications Room	65 sqft	
Medication Station	20 sqft	100 sqft
Interview / Counceling	120 sqft	
Therapy / Treatment Room	180 sqft	250 sqft
Support Space		
Waste	130 sqft	150 sqft
Data Room	65 sqft	
Supply Area	100 sqft	
Equipment Storage	120 sqft	
Mechanical	50 sqft	
Sanitation Station	50 sqft	
Staff Offices (or Shared)	65 sqft	160 sqft
Staff Lockers	4.5 each	
Staff Lounge	170 sqft	200 sqft
Cleaning	75 sqft	100 sqft

TABLE 2 - CLINICAL SPACE ALLOCATION

Community Allocation Table

SPACES	SQFT TYP.	/ LARGE
Public Area		
Counceling Services	65 sqft	120 sqft
Multipurpose Space	1000 sqft	
Food Services	200 sqft	
Dining Area	65 sqft	
Social Services	65 sqft	160 sqft
Volunteer Services	250 sqft	350 sqft
Wellness Room (Recreation)	200 sqft	400 sqft
Educational Area		
Classroom (Typical)	300 sqft	400 sqft
Demonstration Kitchen	250 sqft	400 sqft
Lab Area	200 sqft	360 sqft
Stage Area	150 sqft	
Workshop / Art Room	300 sqft	
Site Development		
Community Garden	Space may vary depending on site conditions and design.	
Open Space		
Children's Park		
Art Walk		
Theraputic Garden		

TABLE 3 - COMMUNITY SPACE ALLOCATION

SPACE INTERACTION MATRIX

Program Integration

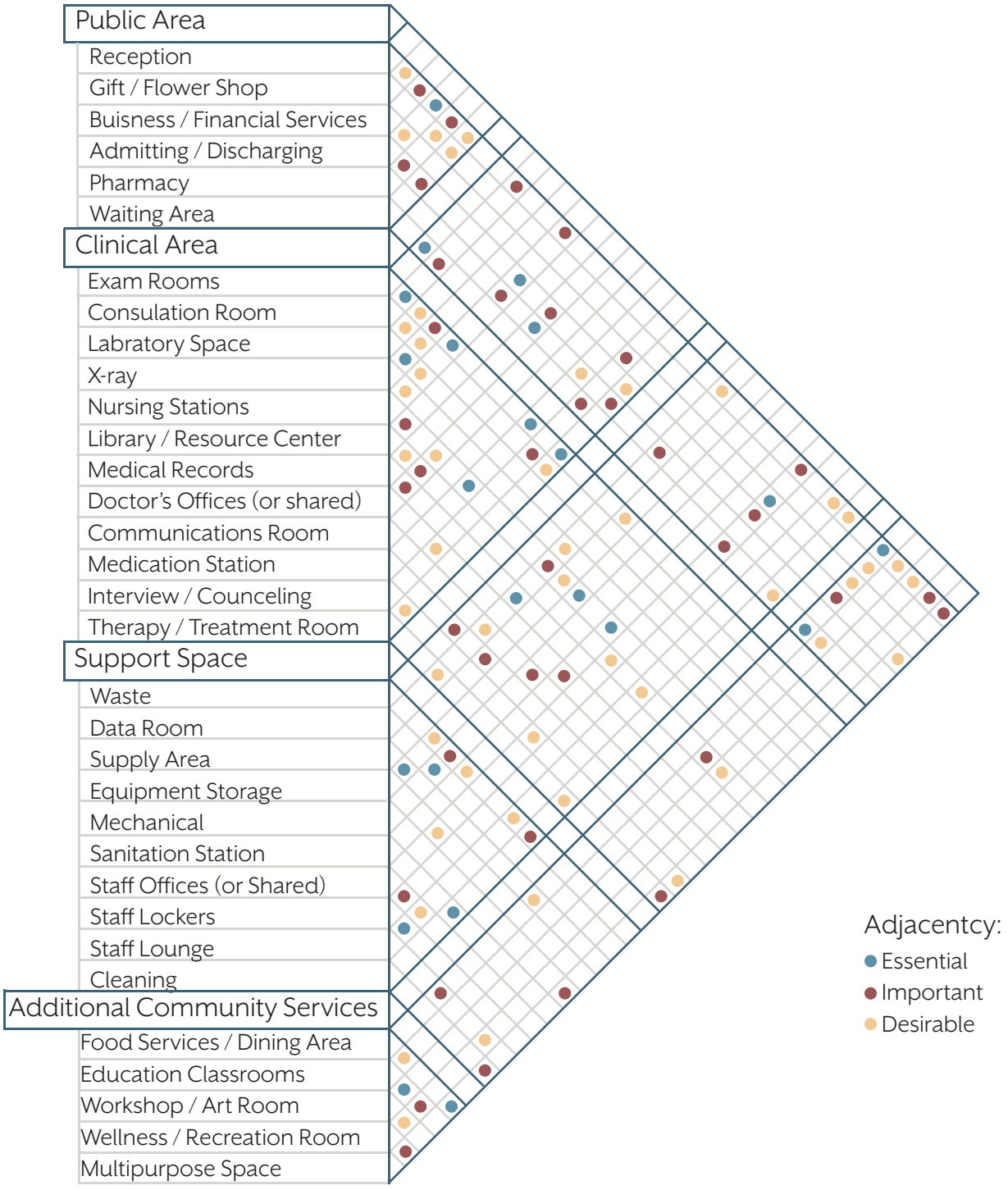


TABLE 4 - SPACE INTERACTION MATIX

INTERRELATIONSHIP DIAGRAM

Program Relations

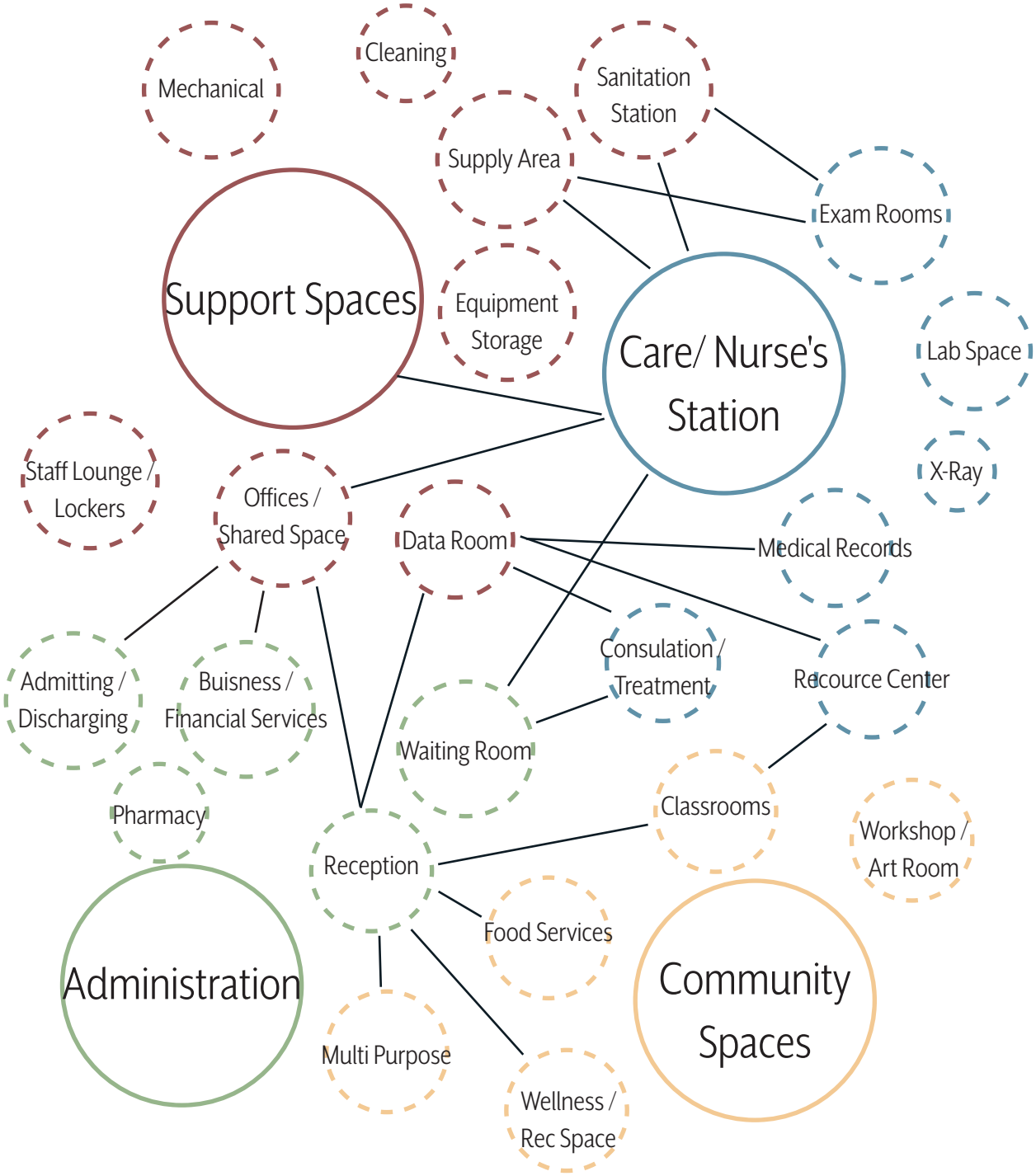


TABLE 5 - INTERRELATIONSHIP DIAGRAM

DESIGN FOR WELL-BEING

THESIS DESIGN STUDIO

FIGURE # - BIOSWALE

DESIGN PROCESS

Narrative

Health and well-being are intrinsically linked to the built environment. They are shaped by the circumstances where people live and work, while the systems put in place to deal with them play a role in the well-being of our everyday lives. Not every community has the same opportunities to be healthy. By using local determinants of health as a guide to program a healthcare facility, such as **physical activity, education, and the social environment**, architecture can provide more opportunities to minimize health inequity and create a socio-economic community.

Health is defined as a combination of physical, mental, and social well-being. In a community with little **access to healthcare, healthy food, low graduation rates, and poverty**, the design provides opportunities such as a café, classrooms, and cultural center to become a place to go when one ill, as well as when they are well. This thesis seeks to develop the efficiency of healthcare architecture in a way that makes it more affordable for those who cannot currently access it. This will be done through circulation, efficiency analysis, and modular design, with the goal of creating a community center and clinic to meet the needs of the community it serves.

PROGRAMMING DEVELOPMENT

Site Analysis

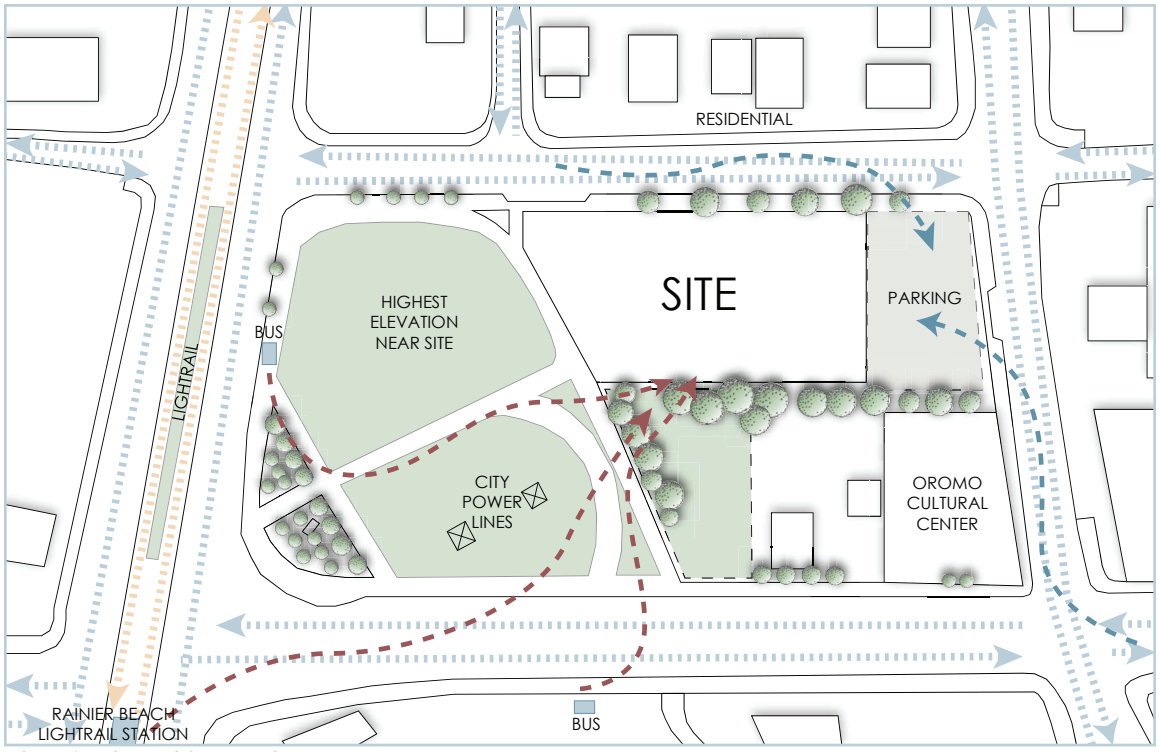


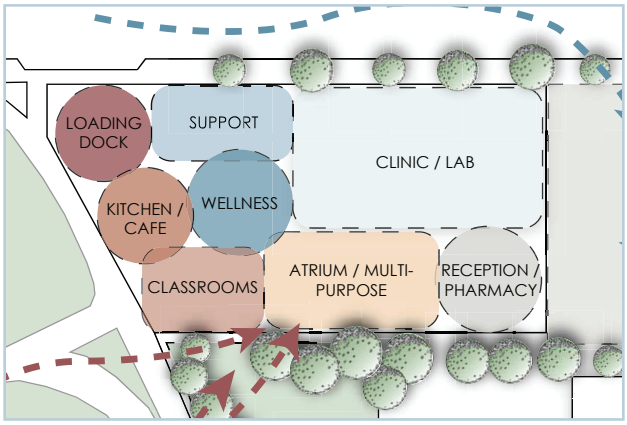
FIGURE 45 - SITE PROGRAMMING

The beginning of the design focused on the circulation and programming of the facility. Because the goal was to create an efficient healthcare layout, the design had to have clear pathways for patient, staff, and service flow.

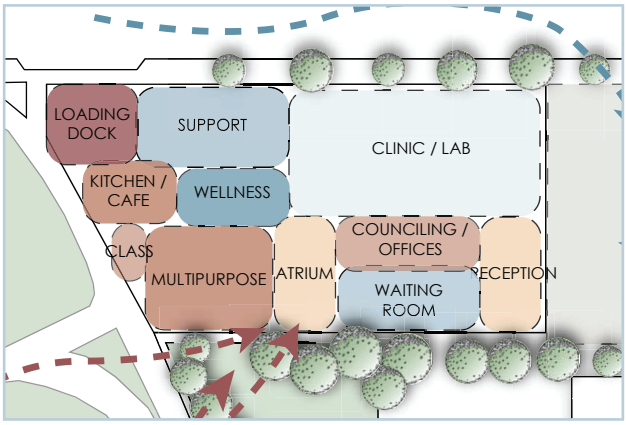
By designating two separate entrances that lead to an atrium, I was able to create two entrances to the facility. One stems from public transportation and accessibility to the site, while the other is designated by those who will be driving to the site.

After creating the entrances, development of patient flow, security, community spaces, and circulation dictated where the final iteration program took place. This would then be developed based on the common pathways and process of patient care and delivery.

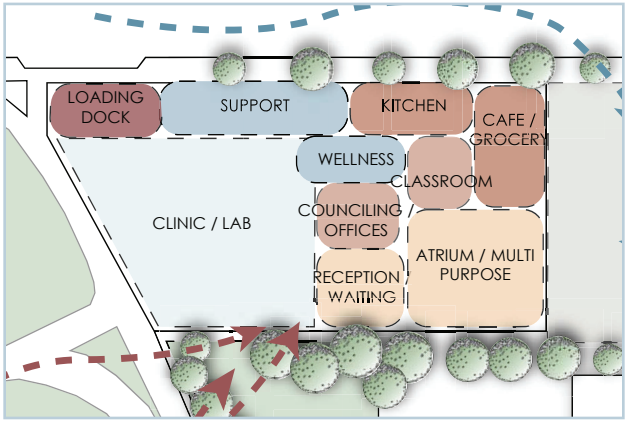
Program Iterations



ITERATION 1



ITERATION 2



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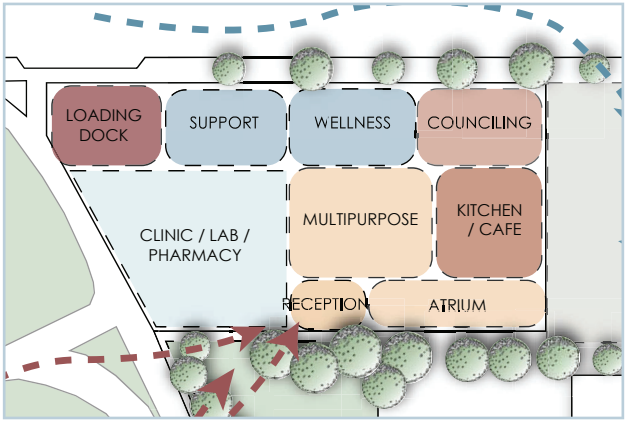

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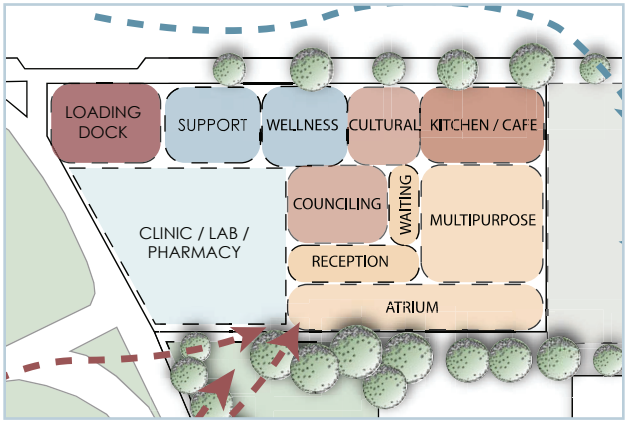

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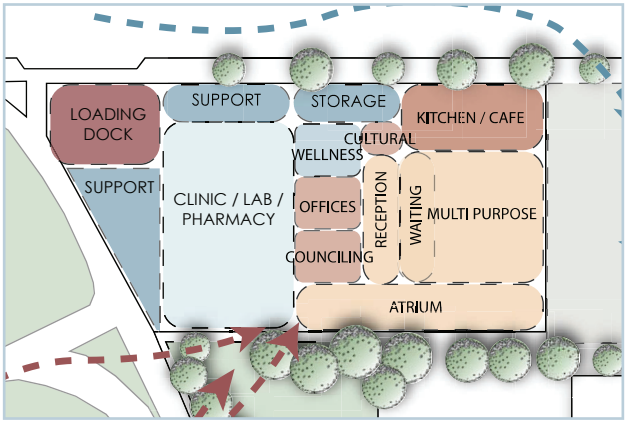
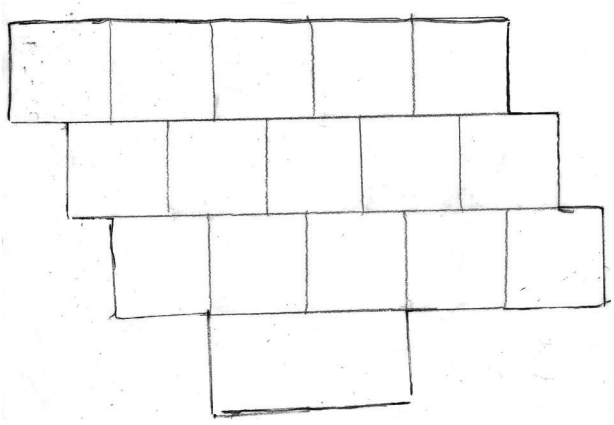


FINAL ITERATION

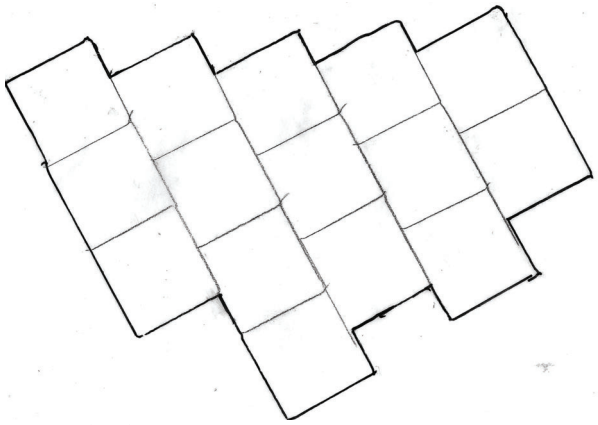
FIGURE 46 - PROGRAM ITERATIONS

FORM AND MASSING

Modular Design



ITERATION 1



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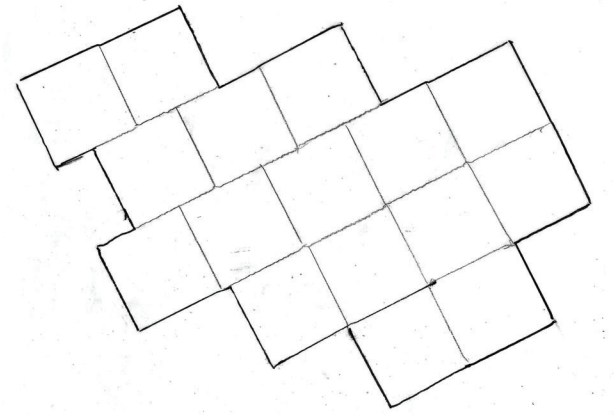
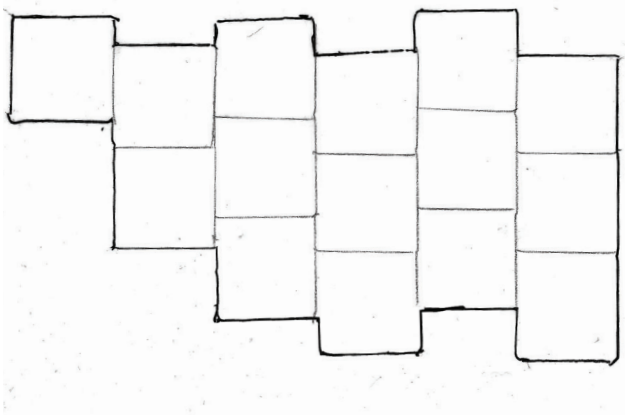


ITERATION 3

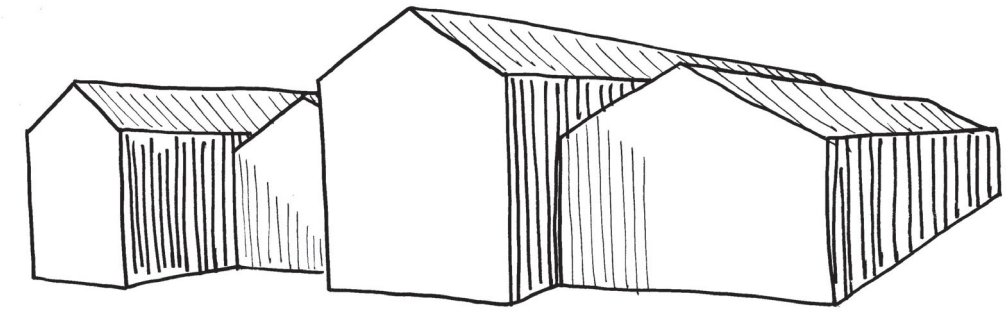


ITERATION 4

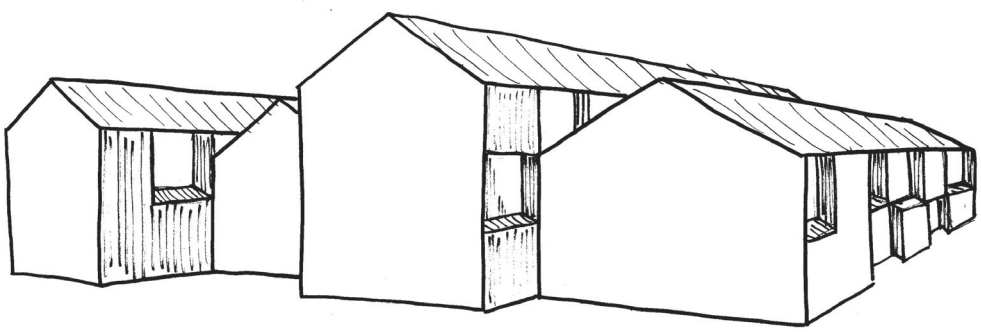
FIGURE 47 - PLAN ITERATIONS

While developing the form of the facility, I started by overlaying masses on top of the program circulation. To make the design flexible and able to be built in other neighborhoods, I leaned towards modular design. This allowed me to develop the program and circulation on gridlines and create a diverse facade with different heights and depth.

Iteration 1 - Gabled Design



ITERATION 1 02.12.19

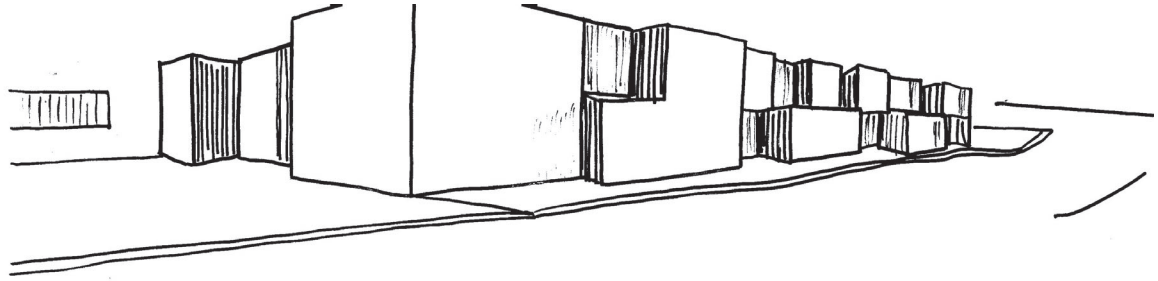


ITERATION 2 02.12.19

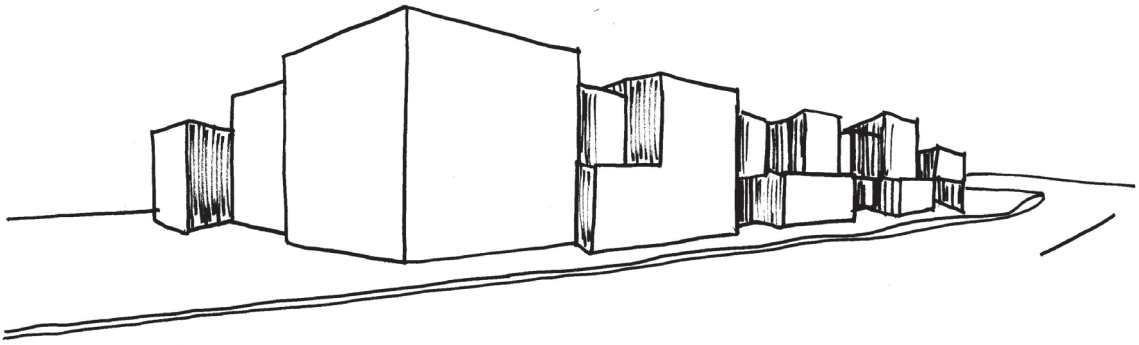
FIGURE 48 - GABLED ITERATION

FORM AND MASSING

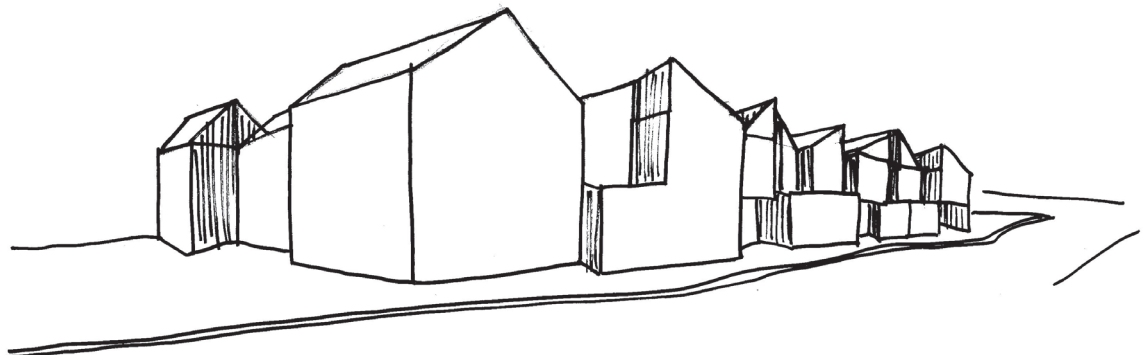
Modular



ITERATION 1 02.12.19



FINAL ITERATION 02.12.19

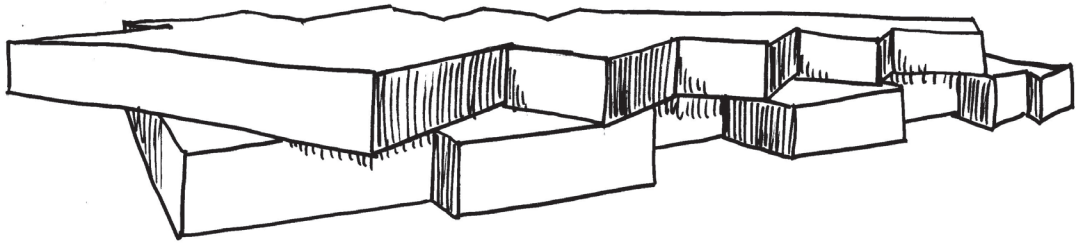


ITERATION 1 02.12.19

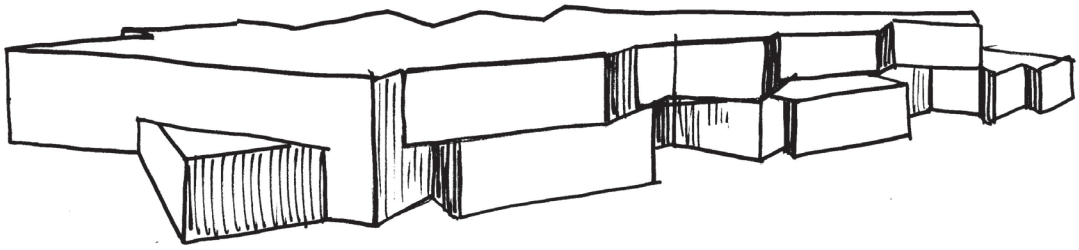
FIGURE 59 - MODULAR ITERATION

The final design was chosen for its diverse height changes, depth and complexity, as well as context to its surroundings. Many of the commercial buildings near the site have a flat roof. This design accommodates the surroundings, while conforming to the modular design and creating a unique form.

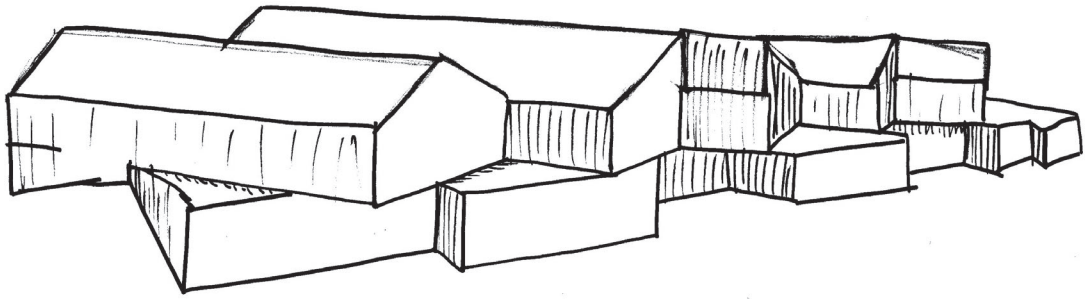
Angled Design



ITERATION 1 02.12.19



FINAL ITERATION 02.12.19



ITERATION 1 02.12.19

FIGURE 50 - ANGLED ITERATION

SITE DESIGN

Access to Site

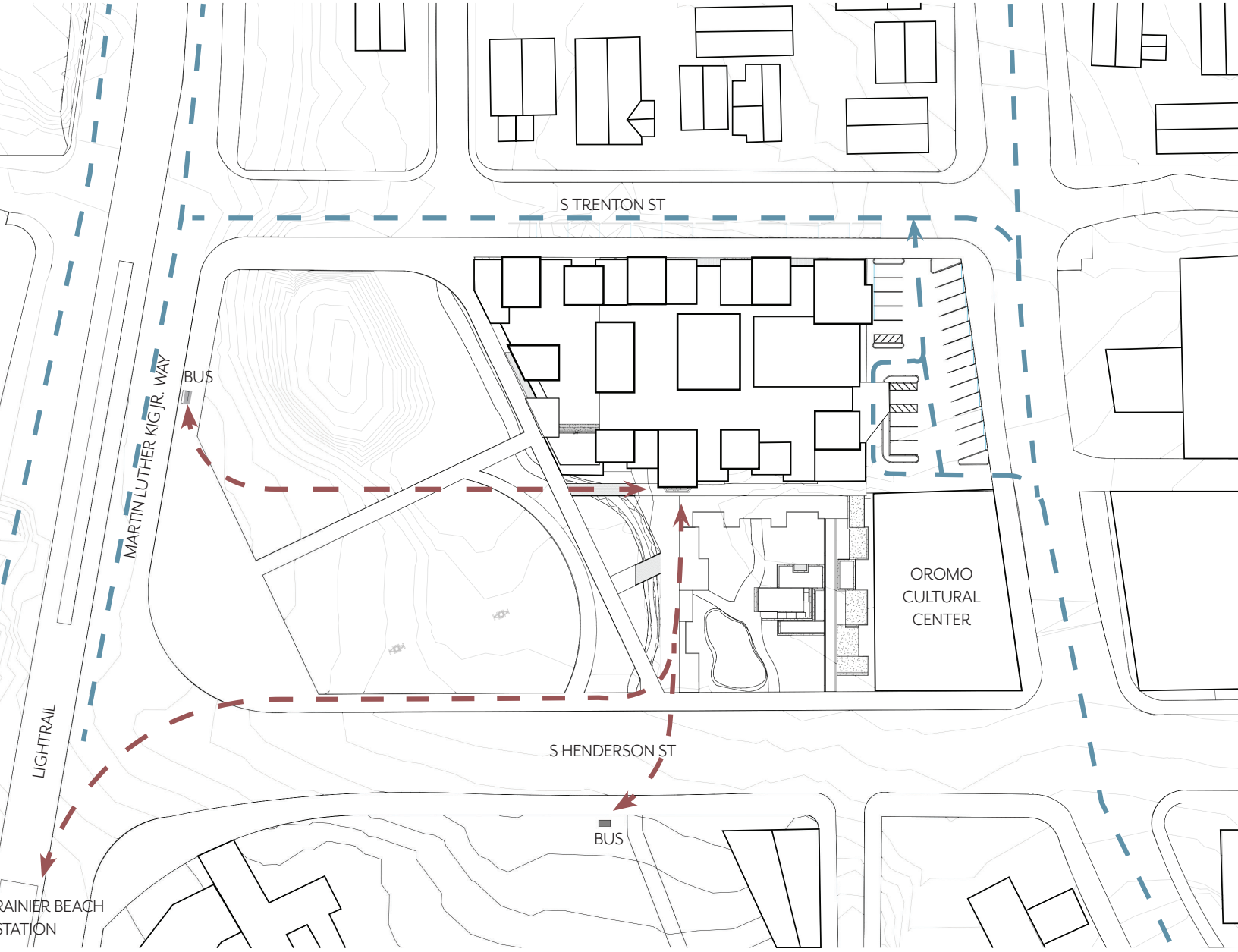


FIGURE 51 - ACCESS TO SITE

Pedestrian Circulation

Vehicle Circulation

Rehabilitation Garden

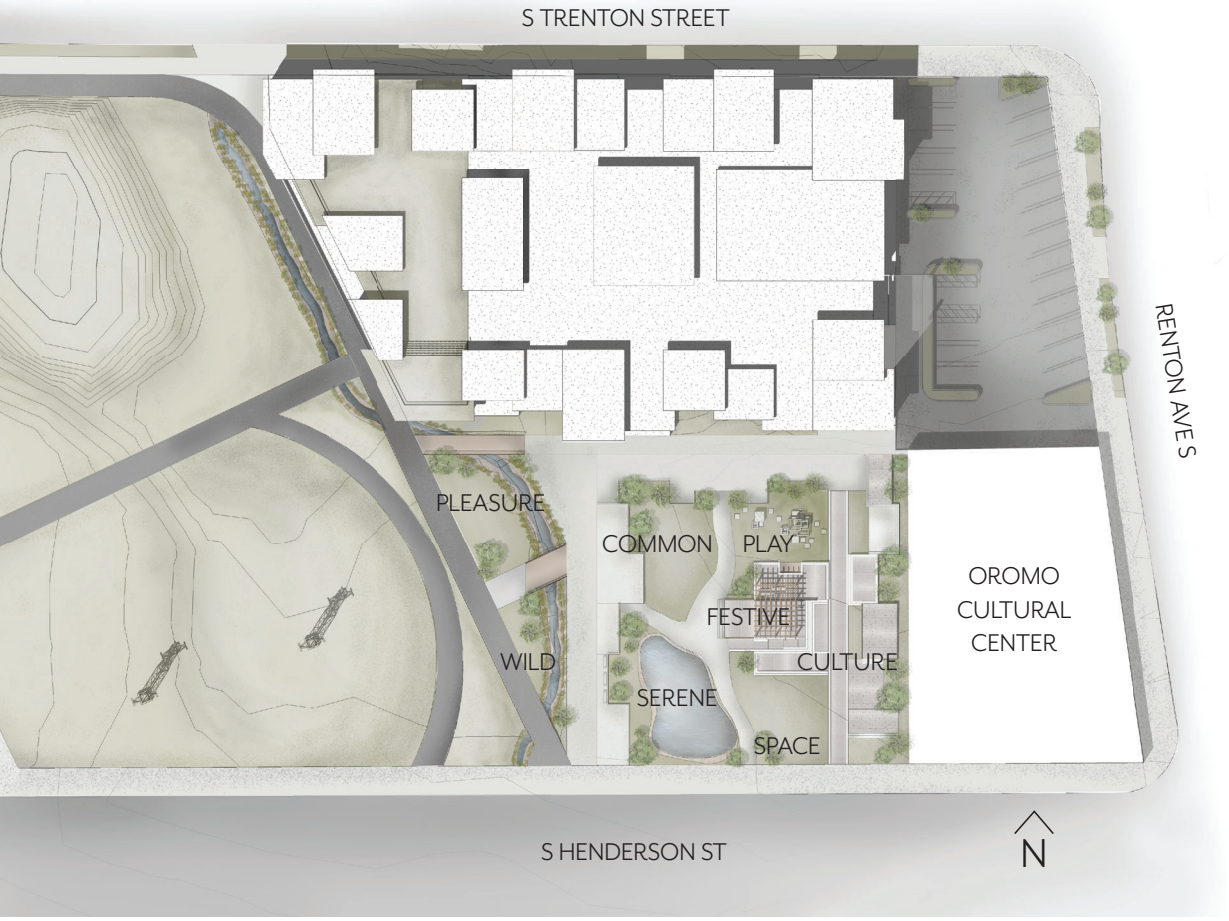


FIGURE 52 - REHABILITATION GAR

Pleasure:

- Enclosed, Safe Space
- Relax
- Secluded

Space:

- Place offering feeling of "entering another world"

Culture:

- Connection to history and time
- Art Walk

Wild:

- Close to Nature
- Plants seem Self-Sown

Serene:

- Peace, Silence, Care
- Sounds of water, wind, birds, and nature

Common:

- Green, Open Space
- Relax and Play
- Be with others

Festive:

- Meeting place for community gatherings
- Activities

FIRST FLOOR

Program

FIGURE 53 - FIRST FLOOR

- Support / Mechanical
- General Clinic
- Clinical Services
- Community Spaces
- Public Spaces
- Administration

Community Services:

- General Care
- Wellness Room
- Human Services
- Cafe
- Teaching Kitchen
- Healthy Foods Store
- Cultural Center

Determinants of Health

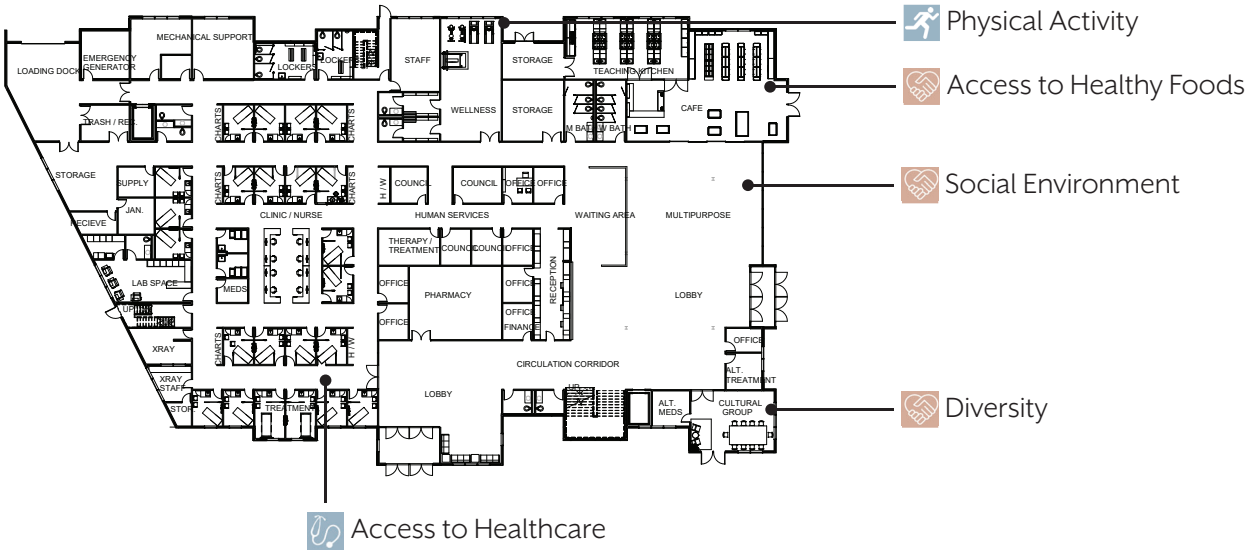


FIGURE 54 - FIRST FLOOR DETERMINANTS

By using the determinants of health to define the program of the facility, there are services provided to the community that they were not able to access before. These reflect the direct needs of the community as reported by the community health assessments (Public Health - Seattle and King County, 2018).

The main floor combines the need for accessible care with the majority of the community spaces. These include opportunities for social interaction, diversity, access to healthy foods, human services, and physical activity. These were listed as biggest needs for the community.

With two entrances, they accommodate circulation for both pedestrian and vehicle transportation. The patients are then moved to reception while community members move towards the multi-purpose space and cafe. The pharmacy is located near the entrance for those picking up a prescription or medication after an examination.

The clinic is split by two main hallways of patient circulation, with the staff workstation located in the middle to serve both halls. These exam rooms have two doors for patients and staff to keep the spaces separate with direct pathways.

SECOND FLOOR

Program

FIGURE 55 - SECOND FLOOR

- Support / Mechanical
- General Clinic
- Clinical Services
- Community Spaces
- Public Spaces
- Administration

Community Services:

- Dialysis Clinic
- Mental Health
- Dental Clinic
- Classrooms
- Resource Library
- Conference Room

Determinants of Health

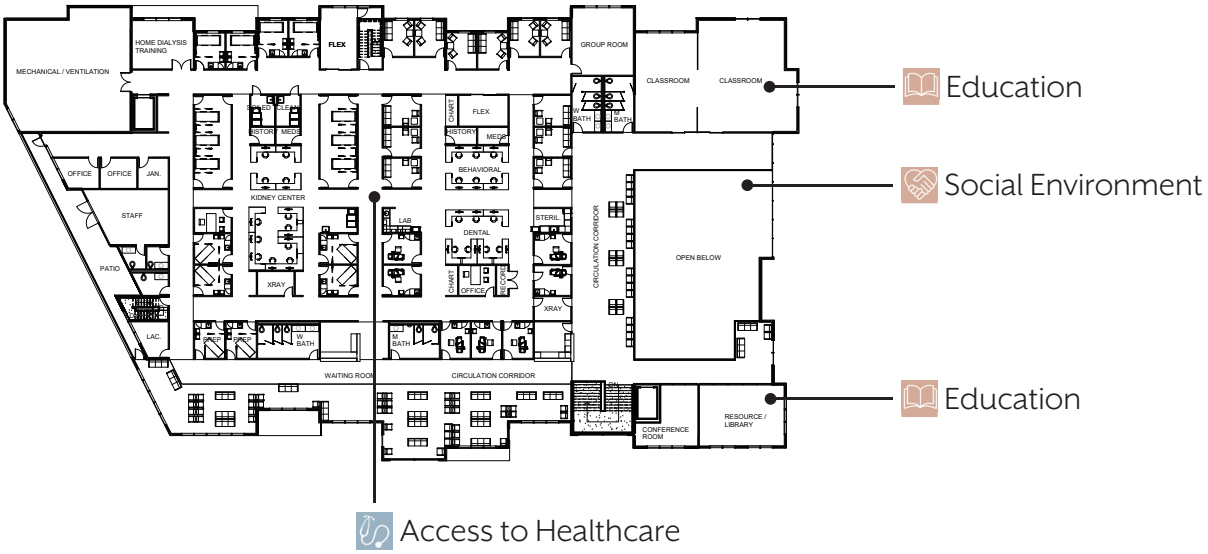


FIGURE 56 - SECOND FLOOR DETERMINANTS

The determinants of health continue on the second floor with a balcony looking out over the multipurpose space. This floor has a focus on educational spaces to promote classes such as language, GED, art, and nutritional information. With low graduation rates within the community, these opportunities will provide knowledge on how to be healthy and continuing education after high school.

With little access to healthcare, the second floor houses mental health, dental, and dialysis clinics. Each of the exam rooms have two entrances for patients and staff circulation. The exam rooms surround the medical workspace to provide close and efficient care to all patients.

Because health is determined by physical, mental, and social well-being, each of these focuses will have a place within the design. The public space acts as a buffer between the community spaces and clinical areas. These spaces act as an opportunity for people to socialize and interact.

SOCIAL ENVIRONMENT

Feeding the Community:

Rainier Beach is located within a food desert, which means it does not have enough access to healthy foods. This can be markets, grocery stores, or community gardens. Because this thesis uses the determinants of health needed by the community, the design features a cafe, teaching kitchen, and healthy foods store.

One of the goals of the community is to create spaces for social interaction and engagement. This promotes a positive sense of well-being into the individual and the impact they feel towards others. The cafe allows people to interact and receive a variety of healthy meals. The teaching kitchen is a place where people can learn to cook healthy meals that can be served in the cafe, giving them a sense of pride with what they accomplished. Once they have learned to cook a certain dish, they will be able to purchase the ingredients needed in the healthy food store to make it for their families.

The social environment within the cafe is continued on throughout the design by the glass doors that open into the multi-purpose space. This space can be used for community gatherings, meet and greets, a place to rest, and extra seating from the cafe. With the amenities provided for a social environment, the design addresses both the determinants of health for a social environment, as well as physical well-being of the individual.

FIGURE 57 - CAFE / HEALTHY FOOD STORE

DIVERSITY

Serving Immigration:

Rainier Beach is one of the most diverse neighborhoods in the country. It is a destination for immigrants that move to the Seattle area, both for its diversity, as well as the housing available.

Adjacent to the site is Oromo Cultural Center. The center offers opportunities to the community for education and spirituality. Being close to the facility offers opportunities for continuing that education and offering immigrants amenities for their health and well-being.

The cultural center within this thesis design offers a group room for a variety of meetings and activities, located in the closest corner to the Oromo Cultural Center for community involvement.

In addition to collaborating with the Oromo Cultural Center, there is a room for alternative treatment and medication. Not everyone has the same medical needs or beliefs. These spaces offer a chance to learn other methods of well-being and treatment that is not typically offered within a standard general clinic design.

FIGURE 58 - CULTURAL CENTER

EDUCATION

Lifelong Learning:

Education and graduation rates within Rainier Beach are low. Only 47% of students graduate high school within 4 years, and half of those students do not continue on to secondary education within the first year. Rainier Beach has a need for better education within the community and this design aims to address that.

Within the community centered side of the facility, there are two classrooms that can be opened into one large room to fit the needs of the classes. These classes may include language classes to teach English or others common within the community, art that can be displayed within the facility, meetings or gatherings, as well as classes for continuing education or earning your GED.

The design also features a resource room that would have information on dietary research, wellness information, language books, and other topics of education and well-being. This room would be open to the public with a variety of table and seating options to meet the needs of the user or group.

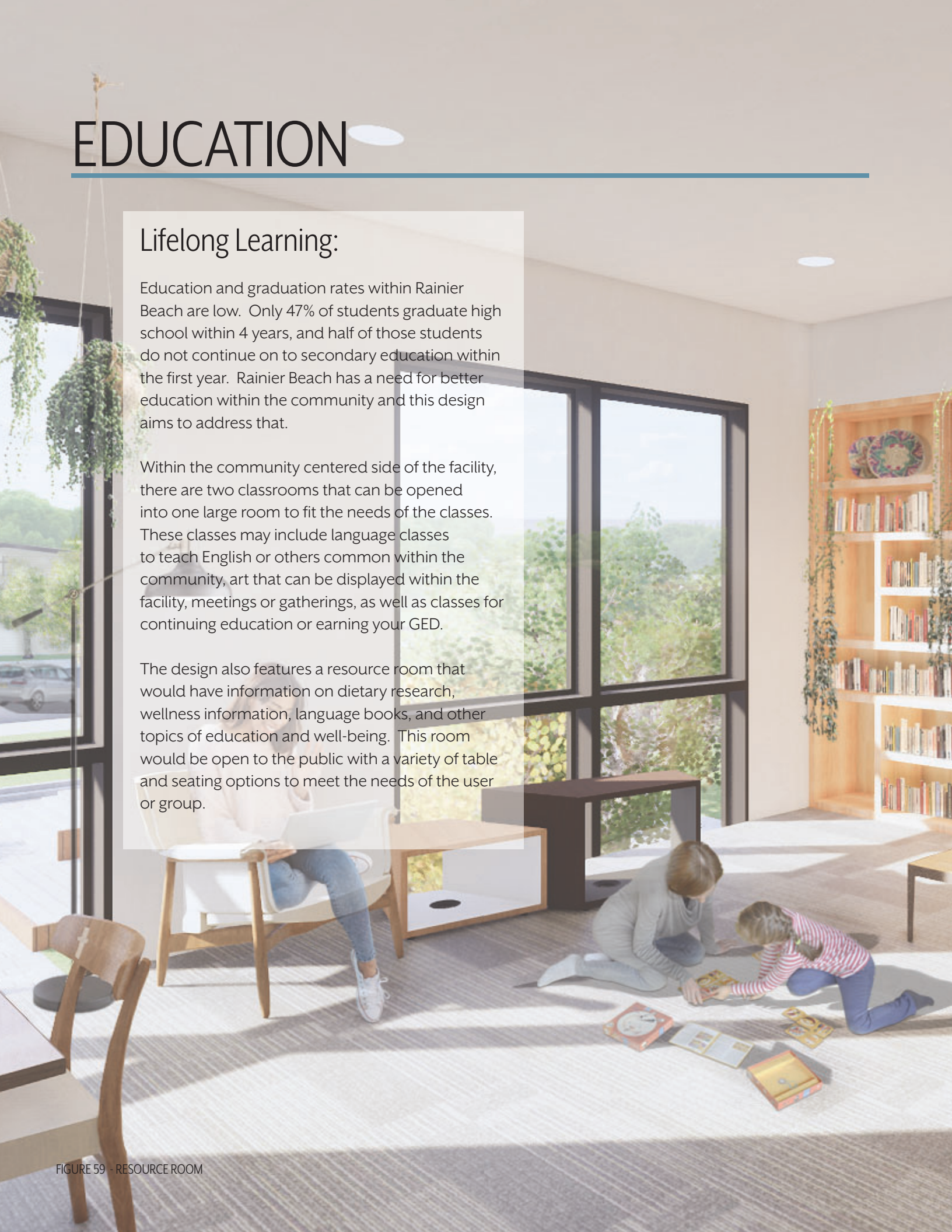


FIGURE 59 - RESOURCE ROOM

PHYSICAL ACTIVITY

Staying Active:

The people within Rainier Beach reported the highest ratings of unhealthy days each month within the Seattle area. They have also reported that people within lower income neighborhoods have higher ratings of heart disease and diabetes. Unfortunately, these areas also have fewer opportunities for physical activity to promote better health.

This thesis addresses the need for physical activity within the community. The wellness room would be available to teach people how to use the equipment, as well as introducing exercises that would be best suited for their health needs. This space could also be used for rehabilitation and health assessments for physical recovery.

This site was chosen for its proximity to alternative transportation and residential areas. This offers residents the ability to take public transportation, walk to the site, or bike along the Chief Stealth Bike Trail. These opportunities promote physical activity outside of the facility and create a connection to the community.

FIGURE 60 - PHYSICAL ACTIVITY

MODULAR DESIGN

MODULAR STRUCTURE

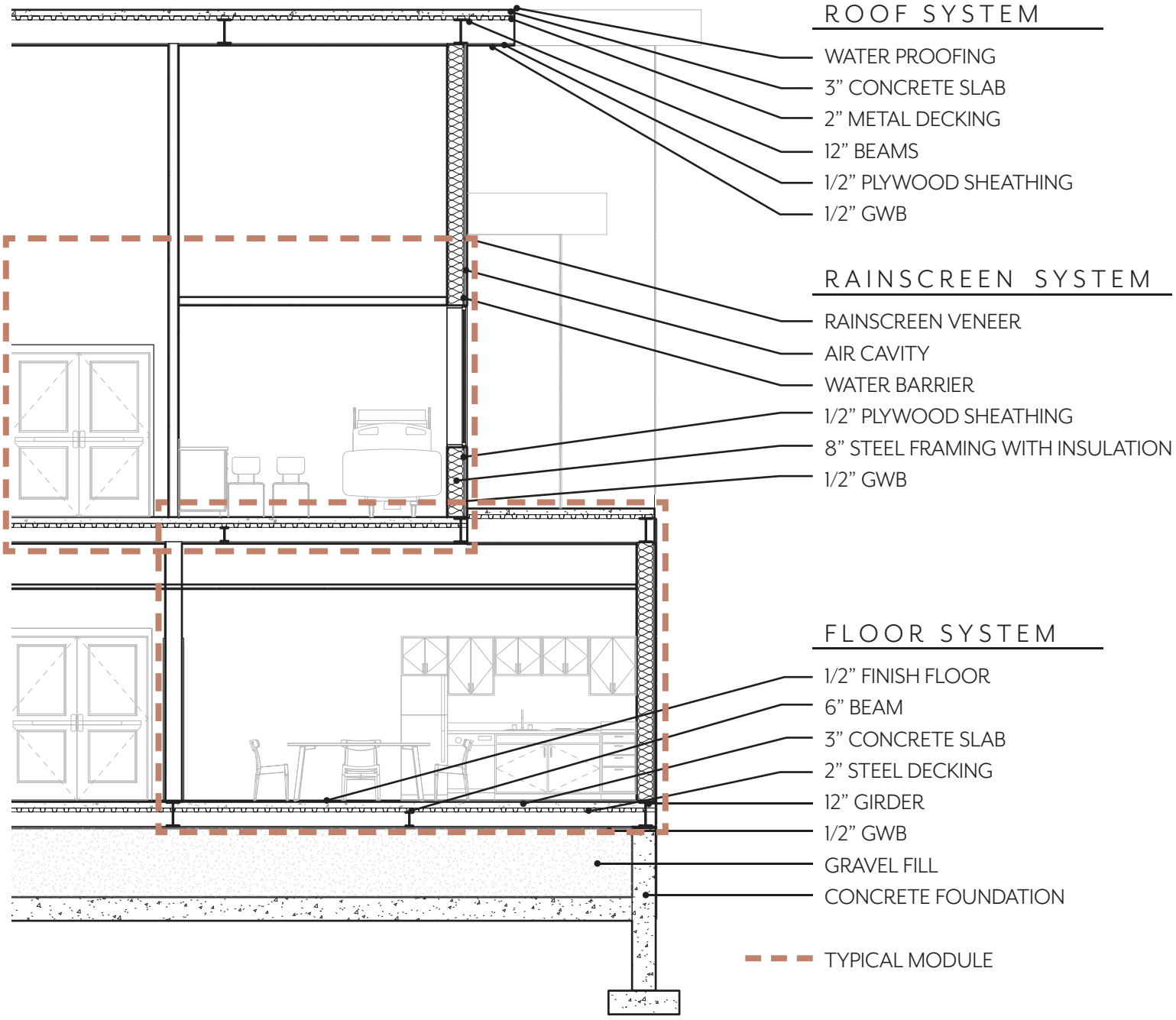
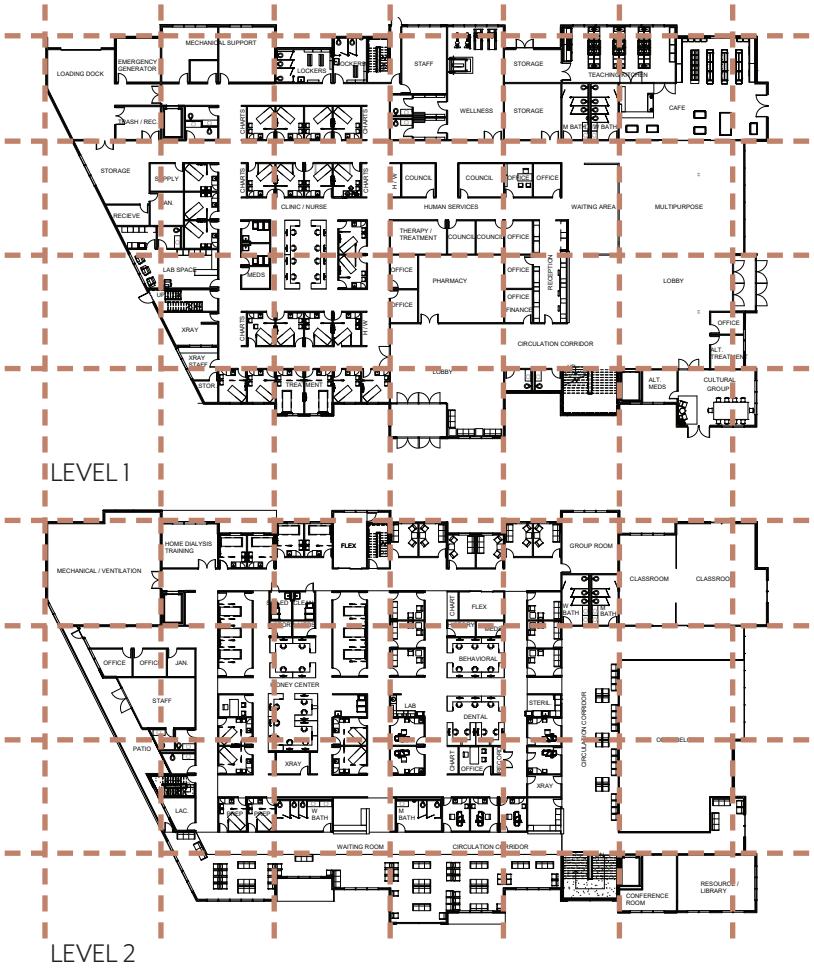


FIGURE 61 - STRUCTURAL DETAIL

Grid lines



Why Modular Design?

To make the design flexible and able to be built in other neighborhoods, I leaned towards modular design. This allowed me to develop the program and circulation on gridlines of 20' and then 4' and 2'.

With these gridlines, I was able to place doors, windows, and wall panels in a modular pattern. These grids lie on both a vertical and a horizontal axis that creates typical modules to be places within the design.

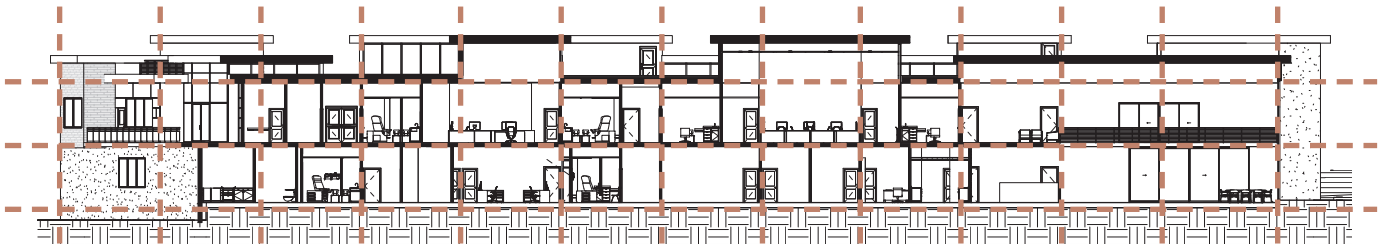


FIGURE 62 - STRUCTURAL GRIDS

TYPICAL MODULE

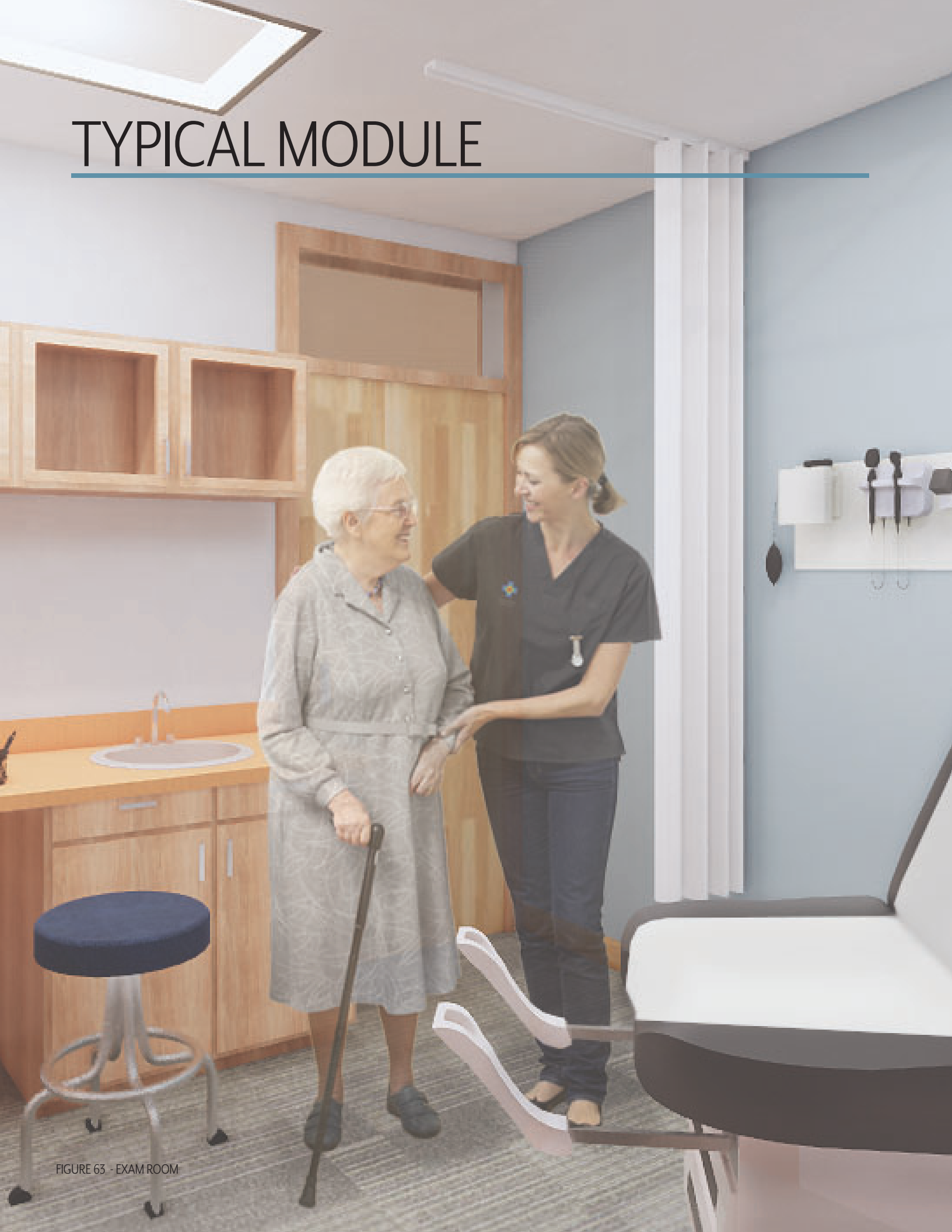


FIGURE 63 - EXAM ROOM

Typical Module

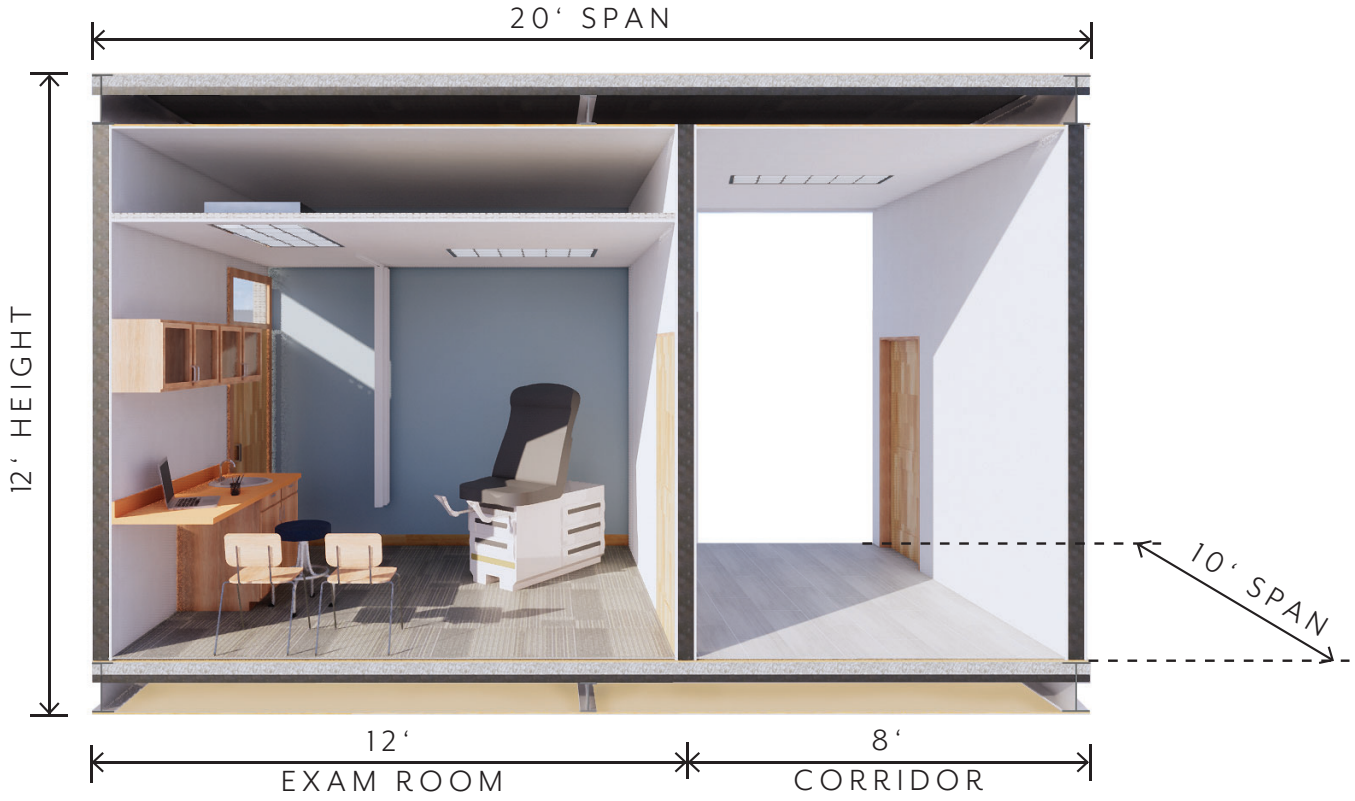
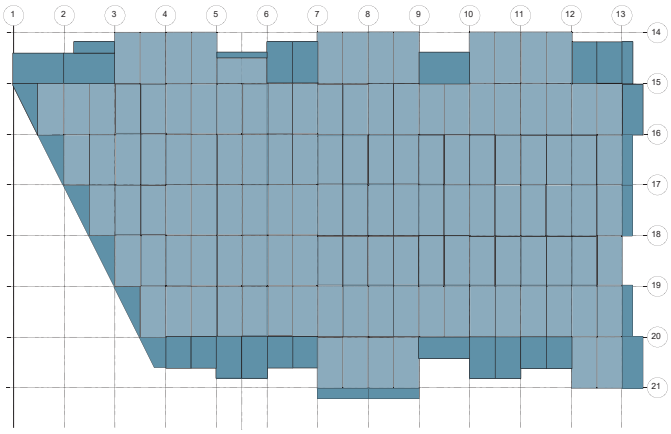


FIGURE 64 - TYPICAL MODULE



Typical Module
Differencial Module

FIGURE 65 - MODULE LAYOUT

By creating standard modules that fit within a gridline, these can be prefabricated and placed on site.

These modules and gridlines allow for standard exam rooms to be created so all staff know where supplies are in each space to give the best care possible.

EFFICIENT DESIGN

Goals for Circulation

1) Create a single path for patient flow through clinic.

2) Streamline patient cycle for care teams with separate pathways and work spaces.

3) Designate direct pathways for patient, staff, and support to be as separate as possible.

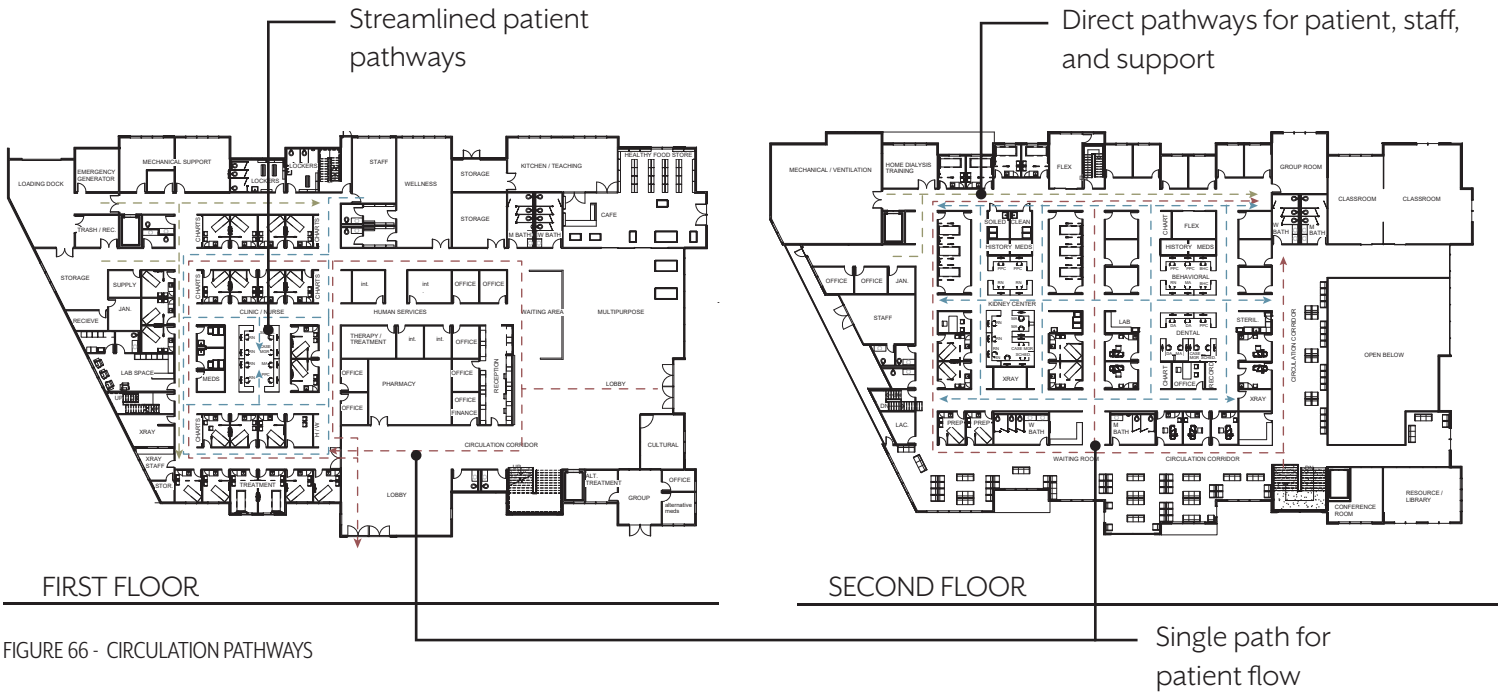


FIGURE 66 - CIRCULATION PATHWAYS

RESPONSE TO PROJECT GOALS

PATIENT CIRCULATION
STAFF CIRCULATION
SUPPORT
COMMUNITY SPACES
PUBLIC CIRCULATION

FIGURE 67 - CIRCULATION ISOMETRIC

PUBLIC CIRCULATION

Connecting Space:

Because this thesis design addresses both the community aspects of health, as well as the phycial aspects of health, the public corridors act as a buffer and connecting space for public circulation thoughout the facility.

The spaces offer views to the rehabilitation garden, sunlight, and social interaction. Because of the modular form, the waiting space design is able to be pushed and pulled to different depths offering spaces of unity and support, as well as seclusion and privacy.

Having public corridors allow patients to be streamlined into specific pathway for efficient circulation. This creates separate spaces for patient and staff to provide more efficient care.

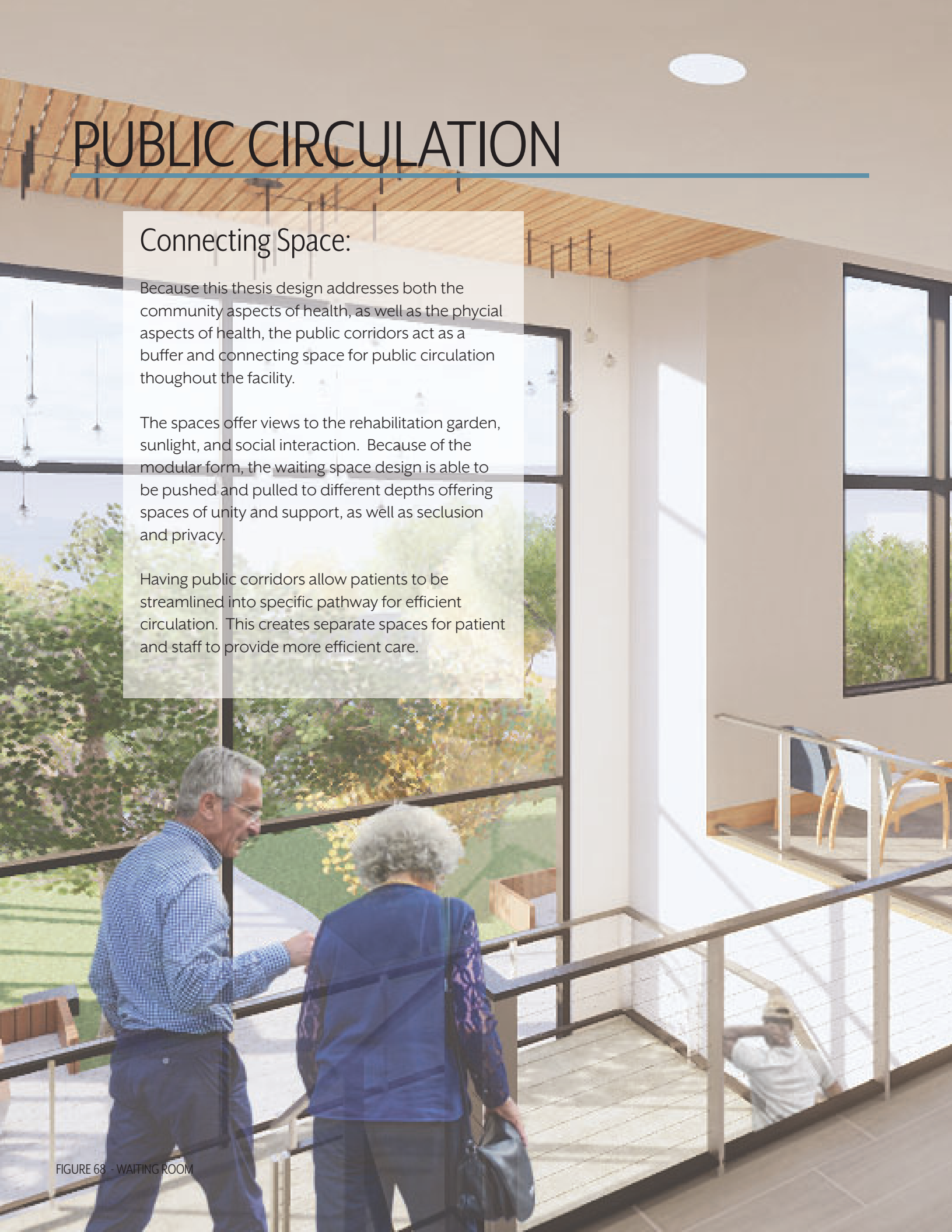


FIGURE 68 - WAITING ROOM

STAFF CIRCULATION

Shared Workspace:

Each typology of care, general, mental, dialysis, and dental, offers a shared workspace of staff members. This allows nurses, doctors, and medical assistants to work directly with each other for the patient's needs. The workspaces are located centrally within the exam corridors to reduce distances for staff circulation.

To provide the most efficient care possible, this design features separate pathways of patient and staff circulation. These pathways lead to exam rooms that each have separate entrances and allow for staff to move about as needed.

On the second floor, the workspaces have higher ceilings that allow natural daylight to enter the space. This promotes a positive work environment and connection to the outdoors.

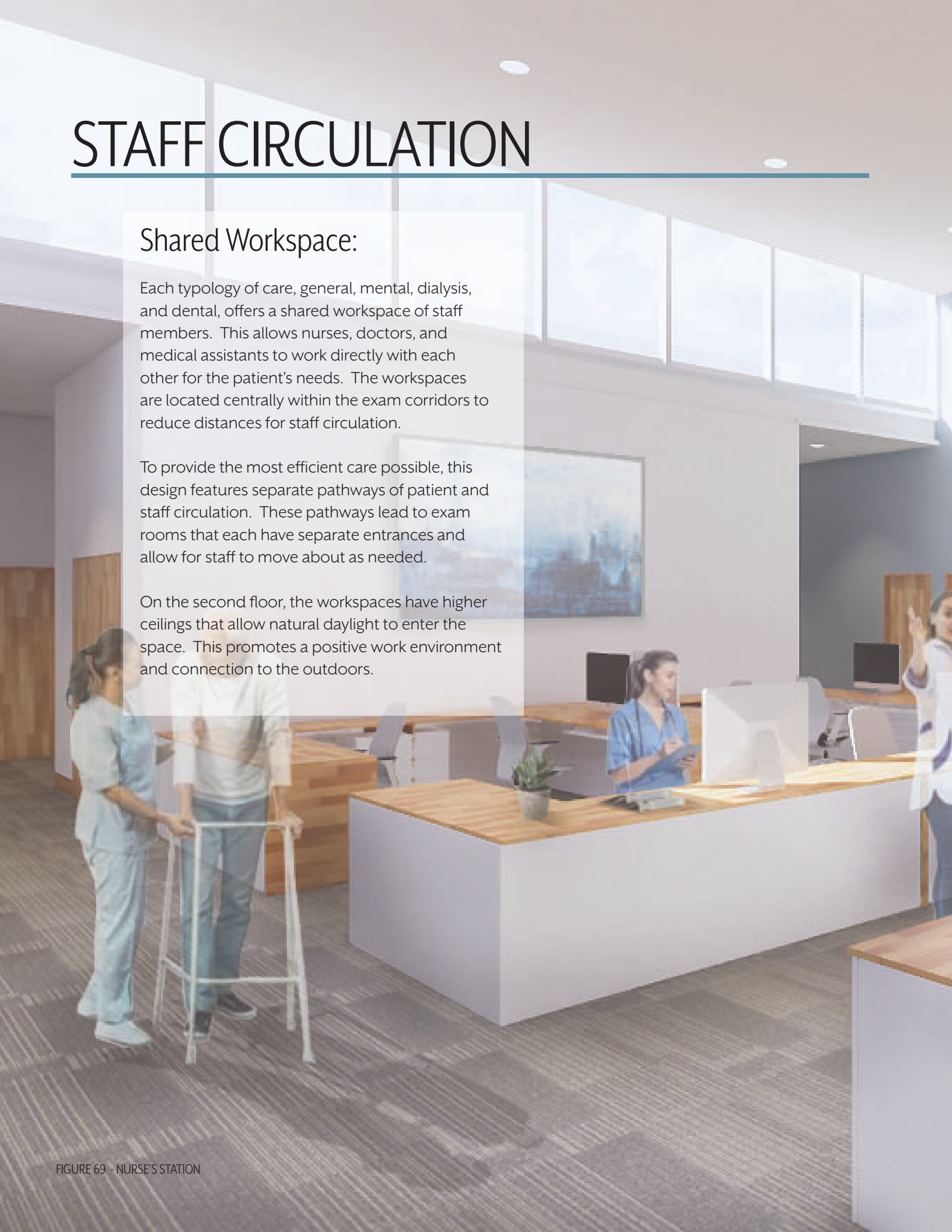
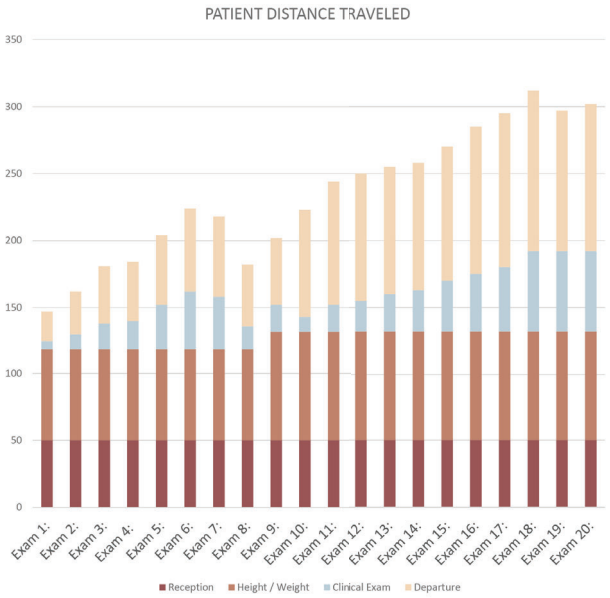


FIGURE 69 - NURSE'S STATION

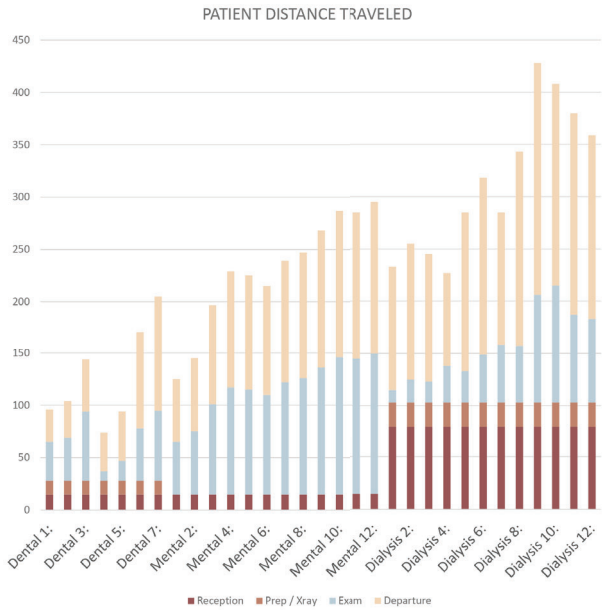
PERFORMANCE ANALYSIS

Patient Circulation



First Floor:

Distance	Total	Clinical Total
Max Distance:	312	262
Average Distance:	235	186
Average Common:	203	153



Second Floor:

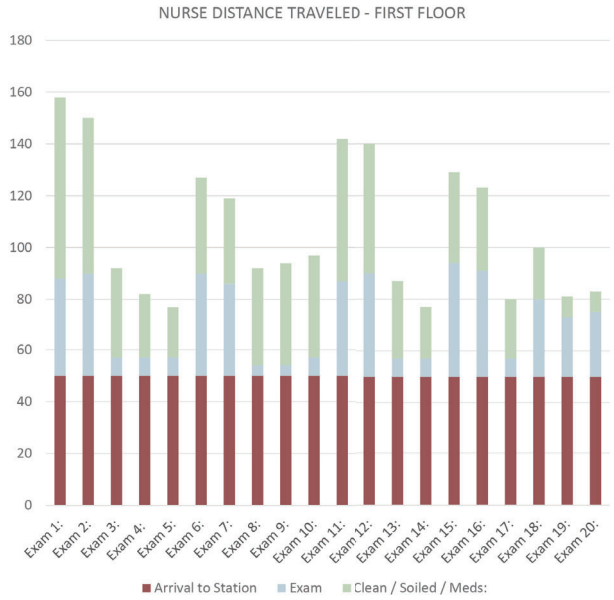
Distance	Total	Clinical Total
Max Distance:	428	348
Average Distance:	239	199
Average Common:	155	140

TABLE 6 - PATIENT DISTANCES

RECEPTION → HEIGHT & WEIGHT → CLINICAL EXAM → DEPARTURE

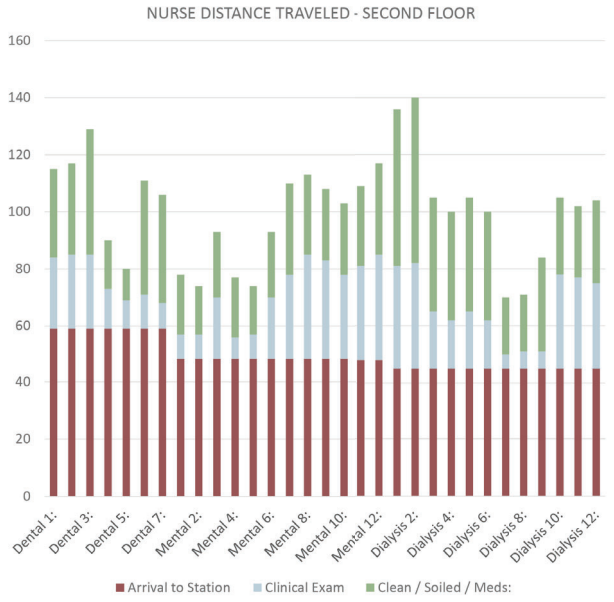
RESPONSE TO TYPOLOGICAL RESEARCH

Staff Circulation



First Floor:

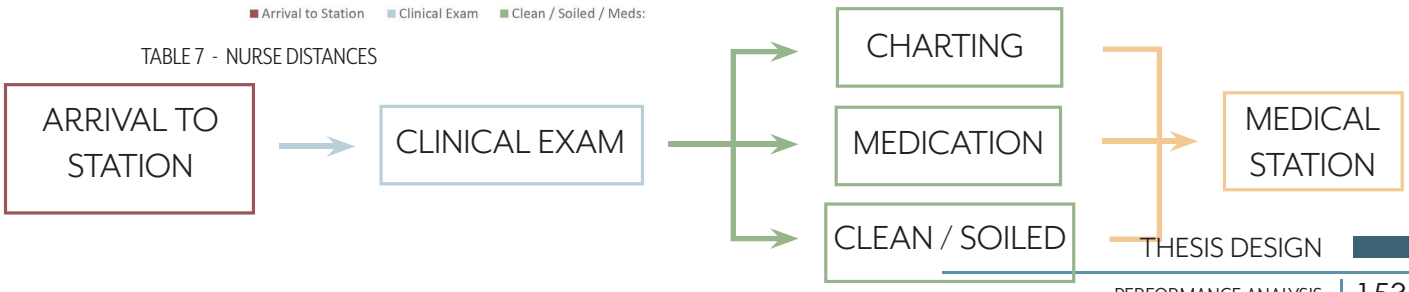
Distance	Total	Clinical Total
Max Distance:	142	108
Average Distance:	104	58
Average Common:	113	70



Second Floor:

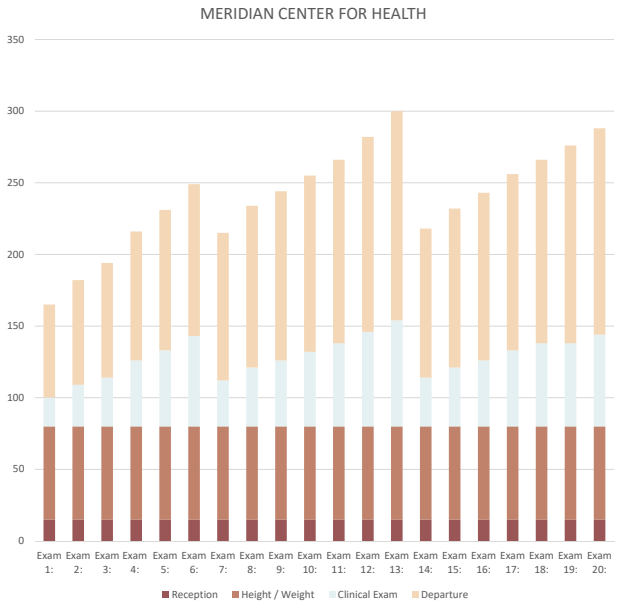
Distance	Total	Clinical Total
Max Distance:	140	95
Average Distance:	101	51
Average Common:	94	42

TABLE 7 - NURSE DISTANCES



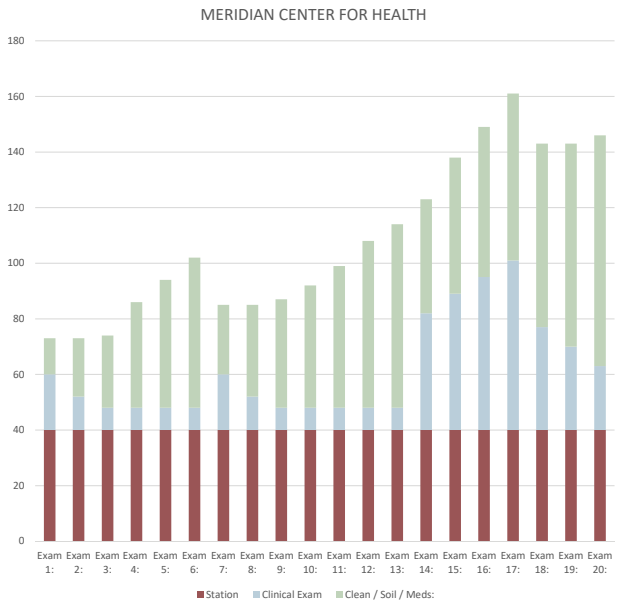
PERFORMANCE ANALYSIS

Meridian Center for Health



Patient Distance:

Distance	Total	Clinical Total
Meridian Center for Health		
Max Distance:	300	285
Average Distance:	241	226
Average Common:	216	201
Rainier Beach Community Clinic		
Max Distance:	312	262
Average Distance:	235	186
Average Common:	203	153



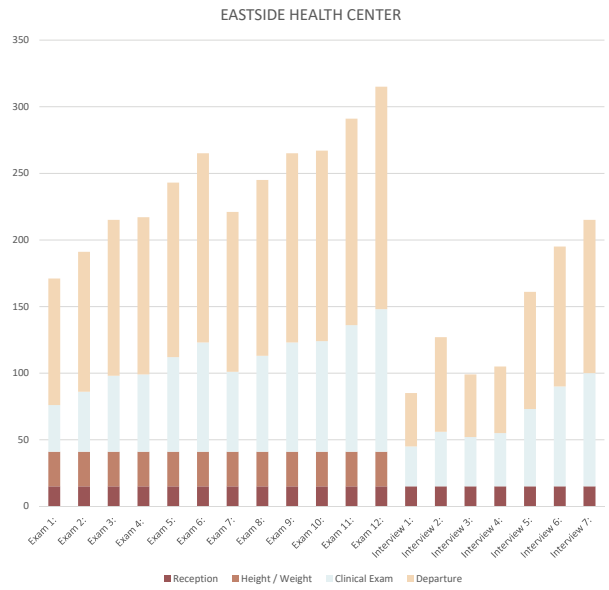
Nurse Distance:

Distance	Total	Clinical Total
Meridian Center for Health		
Max Distance:	161	121
Average Distance:	109	69
Average Common:	102	62
Rainier Beach Community Clinic		
Max Distance:	142	108
Average Distance:	107	57
Average Common:	113	70

TABLE 8 - PATIENT DISTANCES COMPARISON

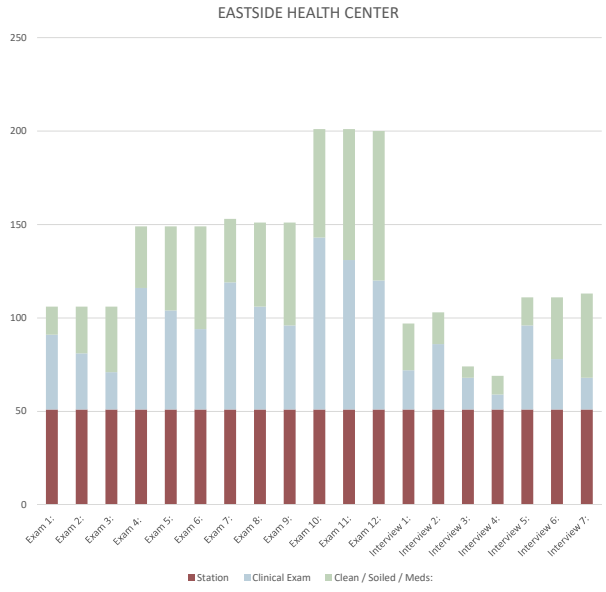
CASE STUDY COMPARISON

Eastside Health Center



Patient Distance:

Distance	Total	Clinical Total
Eastside Health Center		
Max Distance:	315	300
Average Distance:	205	190
Average Common:	231	216
Rainier Beach Community Clinic		
Max Distance:	312	262
Average Distance:	235	186
Average Common:	203	153



Nurse Distance:

Distance	Total	Clinical Total
Eastside Health Center		
Max Distance:	252	150
Average Distance:	132	81
Average Common:	181	101
Rainier Beach Community Clinic		
Max Distance:	142	108
Average Distance:	107	57
Average Common:	113	70

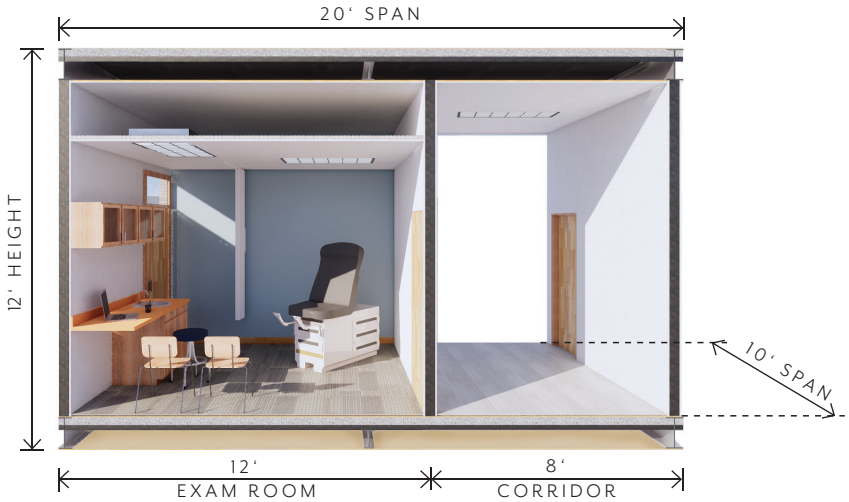
TABLE 9 - NURSE DISTANCES COMPARISON

HOW CAN HEALTH CARE DESIGN

Response to Project Goals

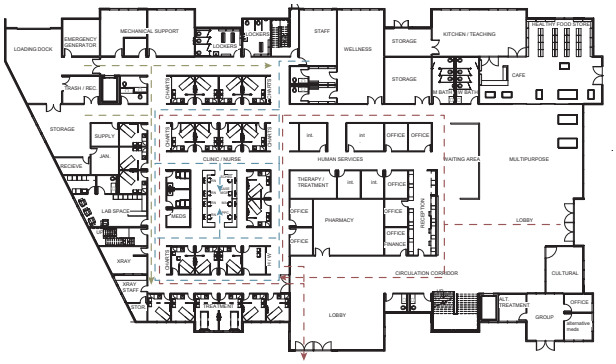
1) Use the determinants of health to reflect the direct needs of the community.

2) Use modular design as a basis for design to be used in other locations as technology changes.



REDUCE HEALTH DISPARITIES?

3) Create an efficient healthcare model that streamlines patients and makes direct pathways for different users.



FIRST FLOOR

SECOND FLOOR

PROJECT INSTALLATION

FIGURE 70 - INSTALLATION

FIGURE 71 - MODEL FORM

FIGURE 72 - MODEL SITE

THESIS APPENDIX

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2ND YEAR:
Fall: Joan Vorderbruggen
Tea House – Site Response and Conceptual Design - Moorhead, MN

Spring: Ron Ramsey
Montessori School – Environmental Educational Facility – Fargo, ND
Small Dwelling – Environmental Residential Design – Cripple Creek, CO

3RD YEAR:
Fall: Regin Schwaen
Visitor Center – Ronald Regan Missile Facility – Cooperstown, ND
Plains Art Palm Garden – Museum and Garden Connection – Fargo, ND

Spring: Bakr Aly Ahmed
Bison Village – Downtown Student Housing – Fargo, ND
Environmental School – Green Teaching Facility – Moorhead, MN

4TH YEAR:
Fall: David Crutchfield
Highrise Capstone – San Francisco, CA

Spring: Paul Gleye
Urban Design Studio – Study Abroad – Brussels, Belgium

PAIGE FALK

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"North Dakota State University is where I found friends, creativity, and a community that's always there for you. Go Bison."